

MANUFACTURERS RECORD

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A Publication for Executives

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JANUARY, 1945

Number 1

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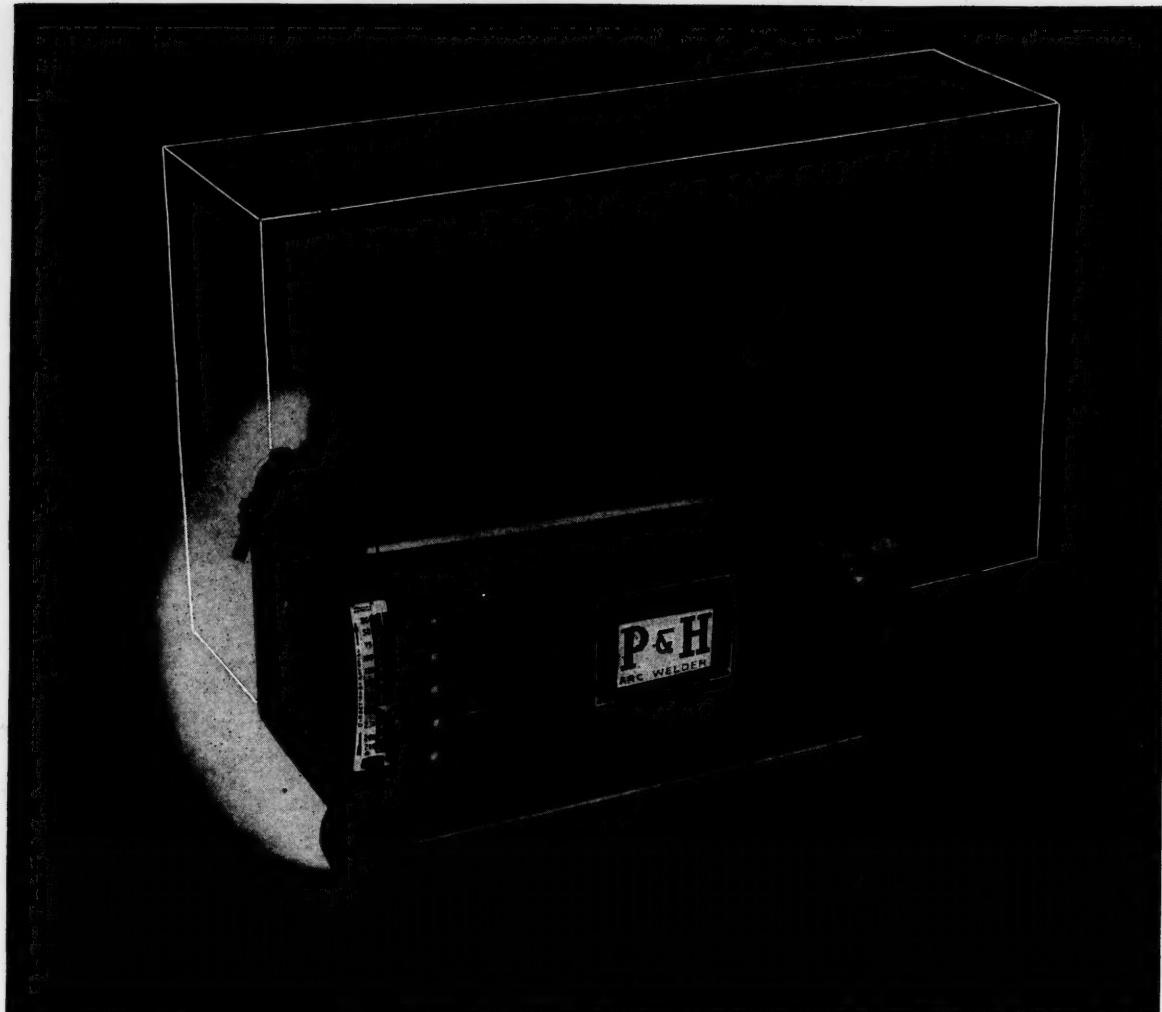
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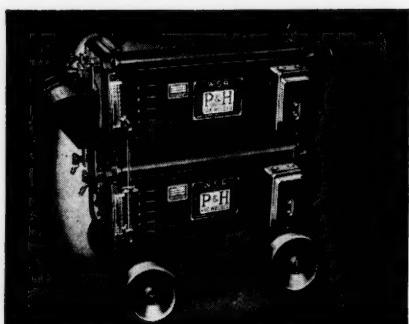


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"What Enriches the South Enriches the Nation"

SOAK THE SUCCESSFUL

We, editorially speaking, were opposed to the principle of a graduated income tax when we first took a job paying \$25.00 a week. We still are opposed to it.

We are opposed to it because it is discriminatory as between different economic segments of society. We are opposed to it because we believe that a graduated rate of tax is undemocratic and therefore unfair in a democratic republic.

We also are opposed to it because, through it, the real purpose of all taxation, the raising of the required capital to finance government has been perverted and used to include the socialistic idea of leveling down leaders to the floor of the masses.

It is discriminatory and unfair because it is based on and includes only the amount of money a man earns and excludes all other elements in man's life that have not been processed through this medium of exchange.

A graduated income tax very definitely discriminates between the man who earns his livelihood on the land and the man who works for a wage or a salary—between the farmer and the city dweller.

The farmer grows or raises most of his own food. He does not have to buy and pay for it in money and so does not have to consider its cash equivalent as taxable income. The urban worker, on the other hand has to buy all of his food and must earn its cost to him in money. His pay—an exchange of money—is taxable. And it must be remembered that food is the most important of all items that go towards making living possible.

The discrimination between city dweller and farmer is only one of many cases where a graduated income tax favors a group or a profession or a business. Here is another case: An author writes a book. He works on his masterpiece for five years without any financial recompense whatsoever. He sells the

book during the sixth year and receives a large lump sum payment for it and for its stage, motion picture and radio rights. He pays no tax at all for five years and then pays a tax that has been graduated into the very high brackets in the one year when he received payment, a tax five or ten times larger in this one year than it would have been on the same total amount of money if this money had been received in equal amounts in each of the six years of work that were involved. This same illustration can be applied to any artist, scientist or inventor. With but slight modifications this same condition also applies to the stars of the stage and screen, the professional leaders of the diamond, gridiron, ring and court. Their days of earning high incomes are limited to a brief span. Their hope of saving against the necessities of old age has been taken from them by a government that has discriminated against them because their skills are just a bit different from those of "the regular run of shad."

But a graduated income tax is not only discriminatory, as the few examples mentioned above prove, it is also undemocratic. As a matter of fact it is socialistic. Based on the lovely sounding political catch phrase "ability to pay" such a tax by its very nature implies a recognition that our government should be a plutocracy at the same time that it denies such class government and thus places the successful few at the mercy of the plodding many by the means of popular election of legislators. It is a direct violation of the democratic principle that all citizens are equal in the eyes of the law.

"Taxation without representation is tyranny." Wealth is not represented in our Congress. Individuals, as human beings, "created free and equal" are. Is a graduated income tax equality in the eyes of the law?

KNOXVILLE CHAMBER OF COMMERCE

KNOXVILLE, TENNESSEE

December 31, 1944

To MANUFACTURERS
In the U.S.A.

You will be interested
in the articles and advertisements throughout this issue
which tell of Knoxville's diversified industries and of
the opportunities for the economic operation of many new
ones here.

You will be interested
in the rich resources of the East Tennessee Valley where
Knoxville is located -- in the vast supply of minerals and
ores found near Knoxville, in the abundant basic products,
the plentiful labor supply, the cheap industrial power and
water that Knoxville offers new industry.

You will be interested
in Knoxville's excellent transportation facilities - its
trunk line railroads, broad hard surfaced highways and nine
foot river channel, its freight lines and air lines reaching
out to all points in the nation.

You will be interested
in Knoxville's year-round equable climate, its playgrounds
and recreational facilities - the Great Smoky Mountains
National Park and the Great Lakes of the South.

You will be interested
in our agricultural resources - live stock, dairy products,
and a diversified crop program developed under the expert
guidance of University of Tennessee and T.V.A. specialists.

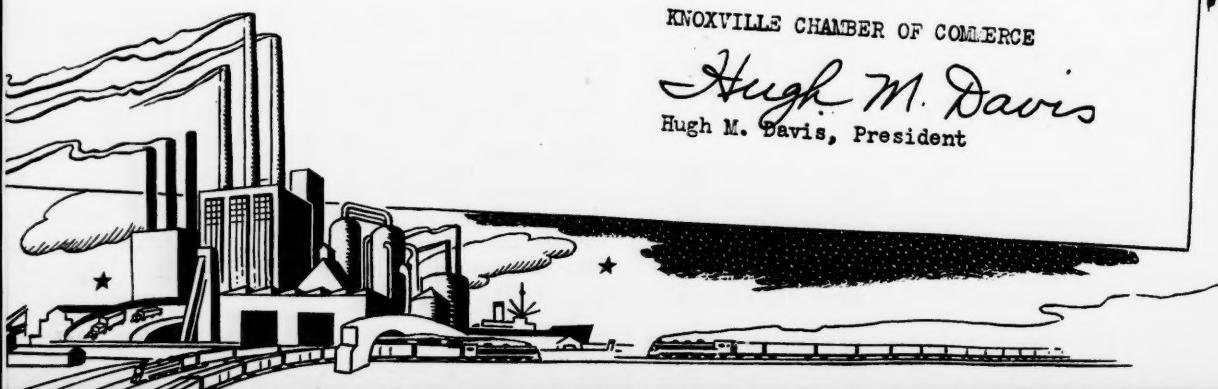
You will be interested
in our up-to-date INDUSTRIAL and COMMERCIAL SURVEY, telling
more of our many resources. It is available to manufacturers
who are interested in looking Knoxville's way for a possible
future business site. Drop us a card and we will be glad
to send you a copy.

KNOXVILLE INVITES YOU.

Cordially yours,

KNOXVILLE CHAMBER OF COMMERCE

Hugh M. Davis
Hugh M. Davis, President





This is the Story
of
Tennessee

T

DIAMOND *with* MANY FACETS

An unknown gem hidden from the sight of our early settlers by the grandeur of the cloud wreathed Great Smokies. This in the early seventeen hundreds was what the world now calls Tennessee.

A diamond of the first water with many facets cut and polished by the courage and free enterprise of its pioneers and by the wisdom and industry of their successors. This is Tennessee today, the Volunteer State.

Looked at from the point of view of history, Tennessee is a mere infant, dating from its first permanent settlement on the Tennessee River about thirty miles from the present site of Knoxville, in 1756. But considered from the point of view of accomplishment, Tennessee is a lusty, vigorous, independent giant in the prime of life who can point with pride to the past and glory in anticipation of the future.

Well may Tennessee point to its past with pride. Its was explored and settled by intrepid men and women. It was developed by the brains and brawn and faith of those who followed them. Sam Houstons and Andrew Jacksons, hundreds and thousands of them, reflect its spirit in the past. Cordell Hulls are living examples of its integrity and honor and of their faith in its future.

From its humble beginning as the sixteenth State in the Union in 1796 with a population of only seventy-seven thousand, Tennessee has grown to its present magnificent stature and has achieved the ideal of equality of balance between agriculture and manufacturing.

Well may the citizens of the Volunteer State have faith in its future. That faith is founded on the fundamental belief of each citizen in himself. It feeds on the knowledge that Tennessee contains diversified natural resources that are the envy of many world powers. It grows on the knowledge that, though it could be completely self sustaining, it can share its bounty with its nation to the mutual benefit of all.

The United States of America may well thank God that Tennessee was, and now still is, the Volunteer State.

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TENNESSEE

THE

VOLUNTEER STATE



EXPLORED and later settled by descendants of British colonists from the east, pioneers who found it a land of great promise, Tennessee's development is a continuous and a continuing record of achievement.

Following in the moccassined footsteps of the trappers, farmers soon had log cabins located as far west as the banks of the Mississippi. In 1772 at Watauga some of these settlers organized the first free and independent government of white men in America. Early historical records show that these pioneers who had located in what was then known as "the West," had very definite ideas of the natural wealth and possibilities of this new land and, too, that they recognized the way it should be governed by and for liberty loving men.

In 1786 North Carolina ceded to the government of the United States the territory that is now Tennessee but this cession was not accepted by the nation during the two years' acceptance period. As a result of this action and lack of action the territory was bereft of any government save that of local communities. To remedy this condition and in order to provide for the public safety and promote the welfare of the people the independent state of Franklin in eastern Tennessee was established and John Sevier was elected as its president.

Three years after the independent state of Franklin came into being it was dissolved in 1789 and its territory became a territory of the United States.



Admitted to the union in 1796 as the third addition to the United States established by the original thirteen colonies, Tennessee, with her 42,022 square miles and 77,262 people, took its place as a sister state.

A vigorous and alert citizenry soon saw the rivers of Tennessee as channels of commerce. They began to develop the resources nature had placed in the everlasting Cumberlands, because they quickly recognized their value in a growing field of industry, an industry which should supply their own needs and many of the needs of their neighboring states.

The Commercial Review of 1840, a recognized authority of the economic development going forward at the time, said "the resources of Tennessee may be



*Above—River wending through Tennessee.
Left—Tennessee stream in rhododendron season.*

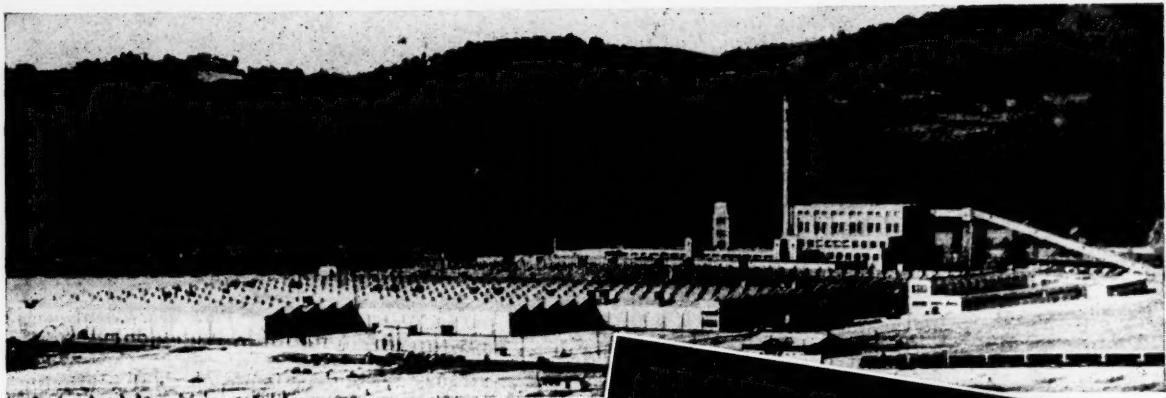
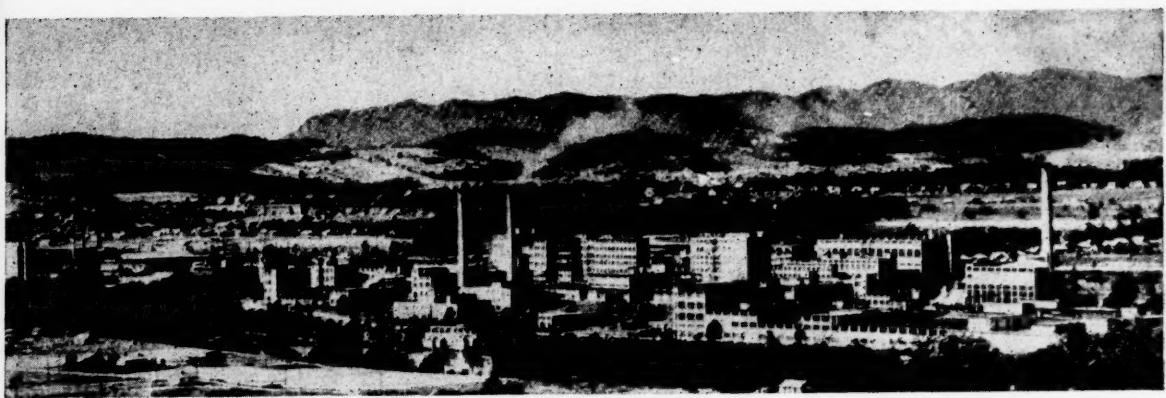


considered inexhaustible," and in quoting figures of the state's agricultural and manufactured output for that year it stated, "she now has cotton factories alone consuming 10,000 bags of cotton; making with a long list of articles not entitled to particular enumeration a grand total of \$44,000,000 of annual wealth," Tennessee's livestock then was valued at \$23,000,000, and "other products of the soil" at \$11,000,000. Corn was bringing 15 cents per bushel; cotton 5 cents per pound; hay \$3 per ton, and Tennessee coal was selling at Nashville from 12 to 18 cents per bushel.

The annual value of the state's manufactured products, according to the latest available figures, is \$728,000,000, and the value of the farm livestock alone has reached a total of \$158,695,000.

The founders of Tennessee built well and their foundation was strong. In succeeding columns there is the record of a state richly endowed by nature which has utilized its advantages and presents an invitation and a challenge to the brains and brawn of the present and future generations. What has been

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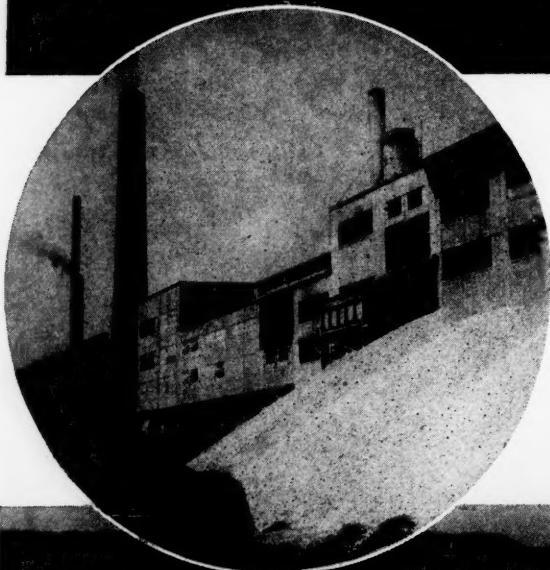


Rayon and textile manufacture, cellulose base products and lumber are important in Tennessee, where a wide variety of industrial minerals also loom large. One of the pictures shows the Tennessee-Eastman plant; another, the plant of the North American Rayon Corporation; a third, the E. L. Bruce Co., and the fourth, a Tennessee ferro-manganese furnace.

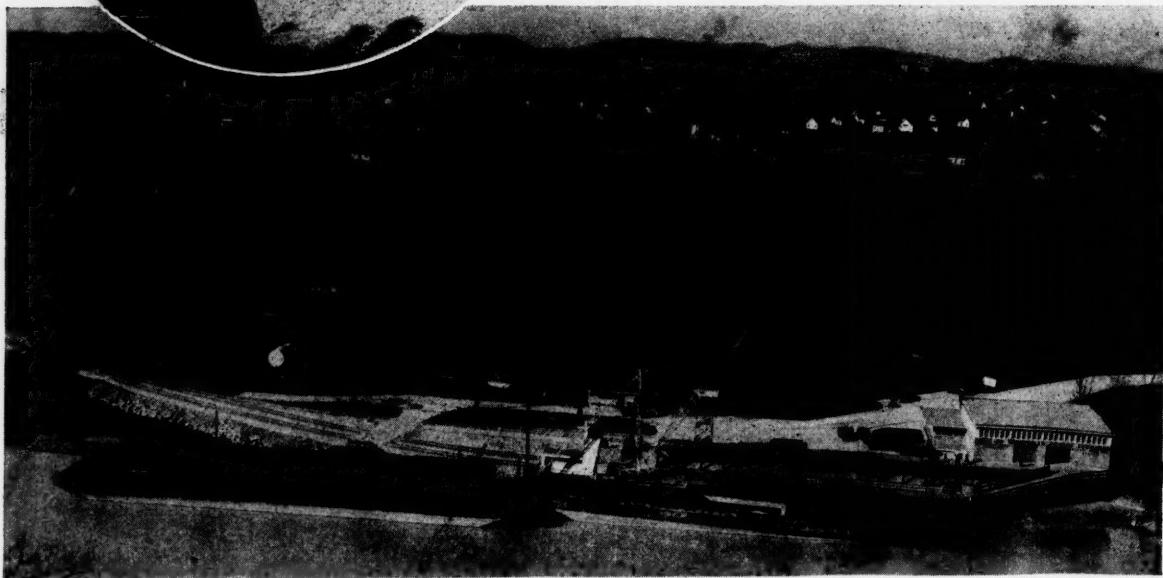




Above—Park near Chattanooga.



Below—River terminal at Knoxville.



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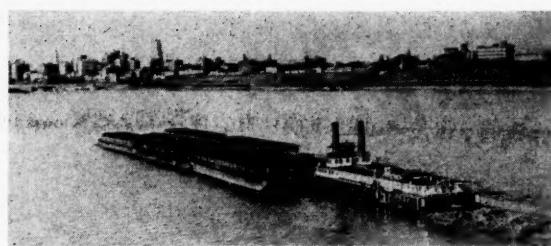


from self sustaining and self sufficing balance between raw materials sources and finished goods. As an example: It may seem a long road of many steps between a field of snowy white cotton to a finished shirt or blouse but that road starts and ends within the borders of Tennessee.

The well nigh inexhaustible mineral resources of the Volunteer State, the forest land, more than half of the state's land area, most of it commercially valuable, as well as its agricultural products offer an evergrowing source of supply of nature's physical blessings to be spun and woven and finished, or molded and baked, or smelted, refined and rolled, or processed and canned, in short, to be manufactured.

All states achieve greatness primarily because the high quality of their citizenry population deserves and earns greatness. Tennessee, far from being an exception to this rule, is an outstanding example of it. Its pioneer stock bred real men and women within the state itself, and its extraordinarily attractive features, both physical and economic, were, and are a constant and far reaching invitation to residents of other parts of the nation to come to Tennessee and add to its common wealth by adding the measure of their own prosperity. In America, and especially in Tennessee, there is no class distinction between capital and labor; there is merely an intelligent and industrious state wide group of justly proud citizens.

Blessed with a beneficent climate, a happy medium between the severe winters of its neighbors to the north and the warm summers of those states to the south, Tennessee enjoys equable climatic conditions that conduce pleasant working conditions and a comfortable and gracious atmosphere for living. Except only in the high mountain regions of the eastern end of the state extreme variations, either seasonal or daily are not prevalent. The average annual tempera-

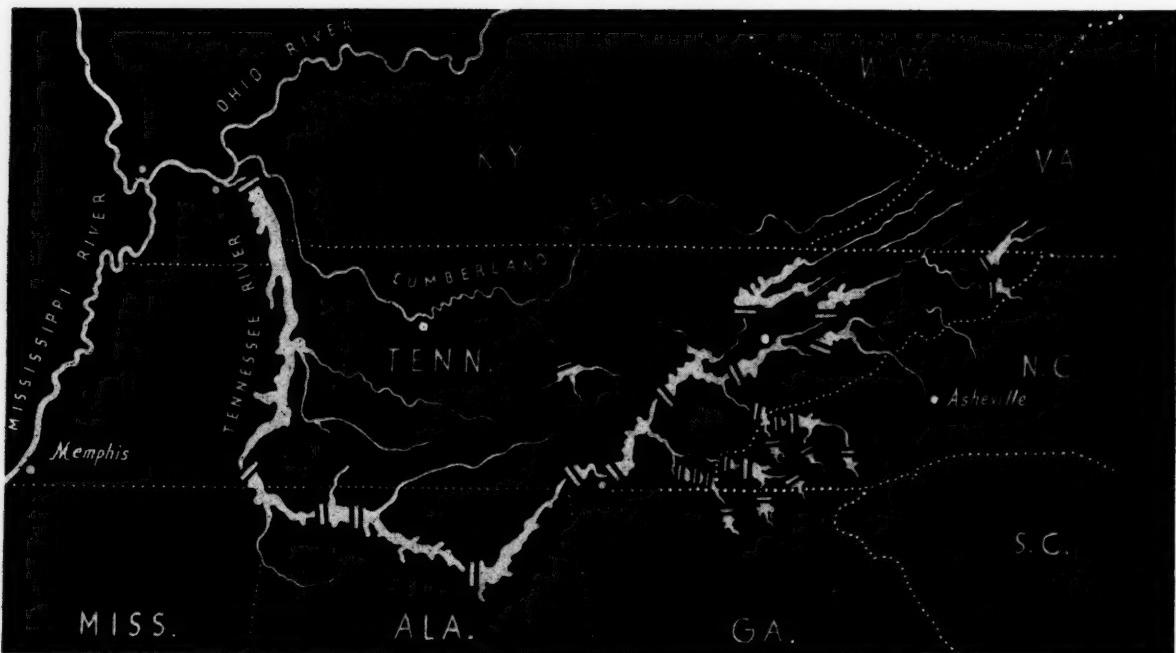


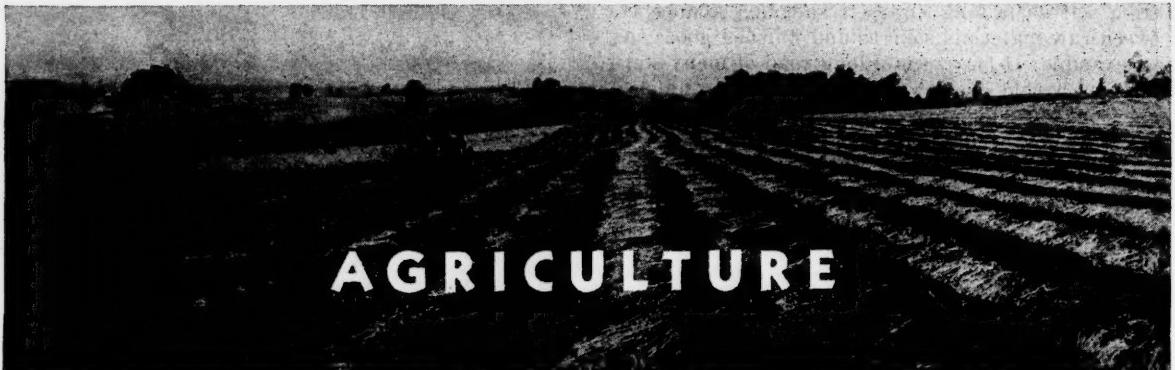
Towboat and barges passing Memphis.

ture for the state as a whole is 58° F. and its average annual rainfall is 50 inches, with its greatest seasonal rainfall in the growing period in the Spring. Killing frosts seldom occur in Tennessee before the last week of October or later than the middle of April. Average totals of snowfall range from only 9 inches in the river lands in the west to 12 inches in the mountains in the east.

The State of Tennessee is divided into three general sections known as East Tennessee, Middle Tennessee and West Tennessee. The eastern section is mountainous and rugged, seamed with valleys, chief among which is the Tennessee River valley, which runs obliquely across the state from northeast to southwest. Middle Tennessee is west of the Cumberland Plateau and has an undulating or rolling surface, with level stretches and an elevation ranging from 500 to 1,000 feet, except in part of the Cumberland Mountains where elevations of more than 2,000 feet are reached. West Tennessee comprises about 10,000 square miles of territory and extends from the Tennessee River on the east to the Mississippi River on the west and includes about 1,000 square miles of Mississippi River bottomlands. Tennessee's population totals around 3,000,000, its area, 42,246 square miles.

Below—Water control system of the Tennessee Valley Authority.





Throughout its active history before Pearl Harbor the chief pursuit of Tennessee's citizens was agricultural. As late as mid-1943 a volume issued by the State said agriculture "uses more land, engages more people, produces more wealth, and affects all other sources of income within the State" than any other of the State's activities. Only in the past few years has Tennessee manufacturing reached a stature enabling it to contest agriculture's predominance.

From eastern Johnson County, high in the Great Smokies, to western Shelby County, down by the Memphis levees, Tennessee is a vast cultivated tract with 18,500,000 of its total 26,885,040 acres in farms. In 1943, 6,777,000 harvested acres produced cash farm income totaling \$311,110,000.

The 1940 Census found 2,915,841 residents in the Volunteer State, of which number 1,275,582 were on the State's 247,617 farms. The stability and solidity of this agricultural wealth is demonstrated when it is noted that in 1920 the farm population was 1,271,708 and that in 1910 the farms numbered 246,012.

In July, 1944, the value of Tennessee farm property was authoritatively estimated at \$1,033,000,000, giving an average worth to each farm of \$3,628 and to each acre of \$48.57, as compared with a farm value in 1920 of \$2,720 and an acre value of \$35.93.

The value of Tennessee farm land has been advancing steadily since 1933, when the lowest figure since 1910 was recorded. As the value of a farm acre is determined by the value of what may be produced upon it, this unfaltering advance in acre value attests

the increasing appreciation of the fertility and diversity of the soil, the beneficent climate which encourages growth, the progressive attitude of Tennessee's farmers and the studious, scientific aid furnished by State and Federal agencies.

Because of these helpful factors, Tennessee has many rich crops, its eggs profitably and prudently in many baskets.

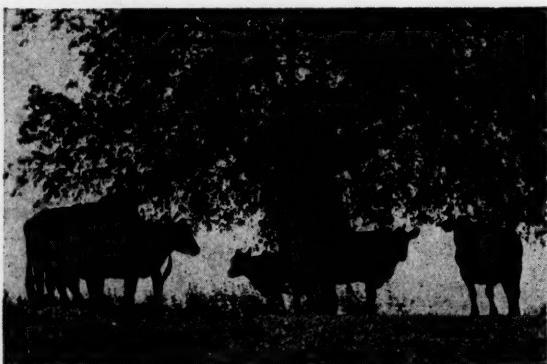
Agricultural Tennessee's chief cash income is derived from cotton, about 85 per cent of it being raised in the 21 Counties west of the Tennessee River, its fiber furnishing much of the raw material for the State's extensive textile industry. In 1943, Tennessee farmers received over \$65,000,000 from their 720,000 acres of cotton. 491,000 bales were produced, an average of 327 pounds per acre.

As progressive Tennessee, eager to learn, applies the latest knowledge to its handling of cotton, it produces more and more from fewer and fewer acres. The 1943 yield of 491,000 bales from 720,000 acres compares favorably with the 1936 picking of 433,000 bales from 797,000 acres, or 327 pounds per acre in 1943 against 260 pounds per acre in 1936.

In acres planted, Tennessee cotton is followed by corn, a favorite crop throughout the State. It is the dominant crop in many of the mid-state counties. In 1941 the State ranked second among the southern states in total production. The total value of a corn crop, much of it being fed to livestock, is difficult to estimate. The U. S. Department of Agriculture reported that in 1943 Tennessee derived \$8,365,000 cash income from its corn. The same source has estimated that in 1944 Tennessee produced 59,950,000 bushels on 2,725,000 acres for an over-all valuation of \$77,000,000, making corn of unquestioned greater value than any other of Tennessee's agricultural products.

The Volunteer State is one of the South's leading producers of dairy products. The well known dairying centers are in the Central Basin area of middle Tennessee and in the valley counties to the east. In these sections "Kraft," "Pet," "Carnation," "Borden" and other nationally known dairy product companies operate cheese, butter and processed milk plants.

In 1943, Tennessee produced 16,023,000 pounds of



Left—Beef cattle in Tennessee.

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creamery and process butter, 23,595,000 pounds of cheese and 182,000,000 pounds of condensed, evaporated and powdered milks, with 8,402,000 gallons of ice cream being churned for the area's sweet teeth. This gratifying production was made possible through the enlargement of herds and the careful handling and breeding of milk cows, the average production per registered cow rising from 2,940 pounds per year to 3,510 pounds.

The State's expanding livestock industry required a similar expansion in acreage planted to hay. In 1944, 1,930,000 acres were harvested.

Little of this hay was shipped from the State, for by that year the livestock people were husbanding some 1,500,000 head, plus 400,000 sheep and 1,800,000 swine. From livestock alone, Tennessee farmers derived \$160,466,000 cash in 1943. The figure for 1944, not now available will be higher.

The State is aggressively developing its livestock pursuits. Many organizations of breeders and scientific workers have been formed to work for the betterment of the several strains which are best adapted to the area. The State is actively participating, and has built a plant in which scientific breeding will be practiced. Among milk cows, Guernseys, Jerseys and Holsteins have been found to thrive best in Tennessee.

Tennessee has long been famous for its "jack" and horse industries. To fix this excellence as a standard, the Stallion Enrollment Board was established. Horsemen everywhere know the "Tennessee Walking Horse" as a strong competitor in many horse shows.

Tobacco is another important money crop of Tennessee. In value, tobacco is the State's fourth crop, but as a cash crop is exceeded only by cotton. The State derived \$38,276,000 from its 1943 tobacco crop which occupied 94,000 acres. The yield of 1,030 pounds per acre was a record breaker, topping the 1942 high by 22 pounds per acre.

Growing of dark-fired tobacco centers in Montgomery, Sumner and other counties of the Northern Highland Rim area. Burley tobacco, which made up about two-thirds of the 1943 acreage, is raised in about 60 counties of middle and eastern Tennessee. The burley production of Tennessee is the second largest in the United States. Tobacco manufactures in the State include pipe and chewing tobaccos, snuff, and nicotine extract, the main plants being at Memphis, Clarksville and Nashville. Only eight counties in the



Picking Tennessee strawberries.

State produce no tobacco.

While the foregoing agricultural activities dominate Tennessee's farm life, other crops are of considerable importance.

Tennessee is the largest nursery producing State in the Southeast.

Soybean acreage in 1944 totaled 248,000, of which 72,000 acres were harvested for beans. The yield of 14.5 bushels per acre was also the highest on record. Production totaled 1,044,000 bushels. Beside their food value for man and animal, soybeans gave impetus to the development of chemurgic enterprises in the area.

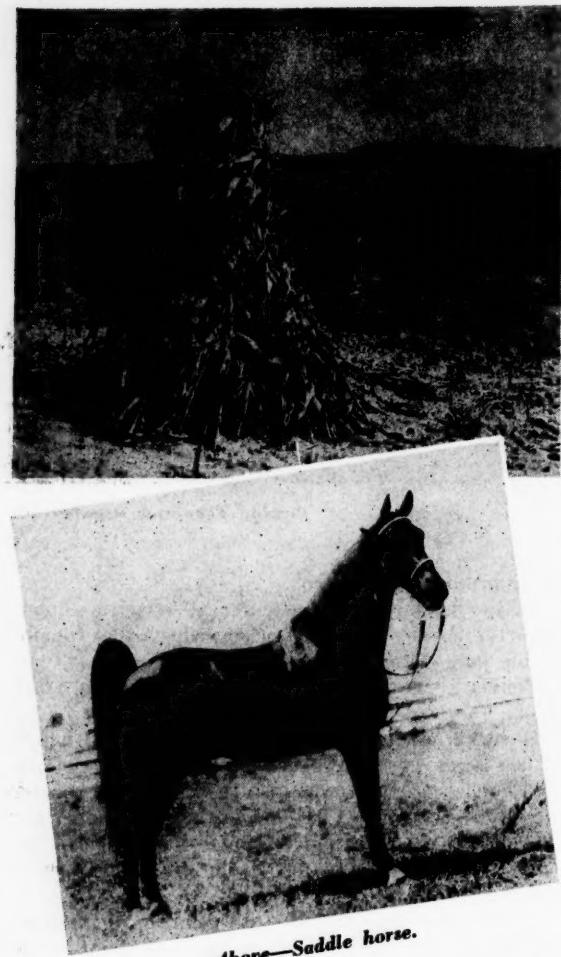
For similar reasons, the 1944 planting of peanuts (20,000 acres) was more than twice as large as the 9,000 harvested in 1942. Production in 1944 was 8,250,000 pounds.

The plea for more war-time food caused widespread Irish potato acreage to be planted in 1944, and the acreage devoted to sweet potatoes was high. The



Above—Tennessee sheep flock.

Circle—Cotton.



Above—Saddle horse.

44,000 acres of Irish potatoes harvested, produced 2,464,000 bushels, a good average of 56 bushels per acre. Forty-three thousand acres of sweet potatoes yielded 4,128,000 bushels, or 96 bushels per acre.

Left—Tennessee corn shocks.

Right—

The principal commercial Irish potato areas center around Franklin County and on the Cumberland Plateau of eastern Tennessee. Sweet potatoes grow most profusely in western Tennessee.

Production of many fruits and vegetables brings hundreds of thousands of dollars to the State. Strawberries are a prominent fruit, with tomatoes and beans high among the cash producers.

The great timber producing activities of Tennessee, considered by many to be a part of agriculture, are discussed in another section.

Other crops of consequence in Tennessee are wheat, oats, barley, rye, lespedeza, cowpeas, sorghum and others.

No economist can draw a precise line where agriculture stops, for it has become an adjunct of manufacturing. With the recent developments in chemurgy, new knowledge coming daily from scores of laboratories and hundreds of individual workshops, making obsolete what was yesterday's innovation and piling up industrial possibilities geometrically, farm products are today as much a raw material for factories as copper or bauxite.

The 1939 Census of Manufactures showed 2,289 manufacturing plants in Tennessee and of these 741, or 30 per cent, were engaged in manufacturing and processing of food products. Manufacturers are daily putting to commercial use the knowledge amassed by chemurgists and other scientific workers and this percentage is probably greater now.

The development of chemurgic industries is particularly favored for the western part of Tennessee, because it is dominantly an agricultural region to which many types of crops are adapted. Gibson County, near the center of this region, is reputed to be one of the most diversified counties in the country.

West Tennessee, extensive producer of cotton, is looked upon as a logical location for new chemical process industries based on cotton or cottonseed as raw materials. The operation at Memphis of a large chemical cotton plant producing alpha cellulose, and

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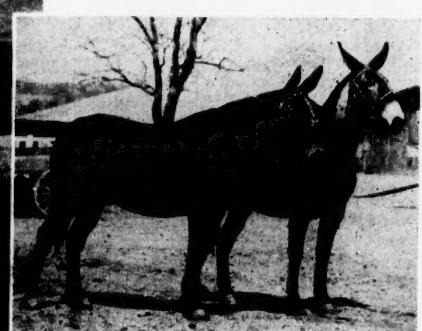
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Left — Alfalfa and wheat growing in Tennessee fields.



Above—Tennessee mules.

Above—

Right—Growing trees for erosion control.

local production of acetic acid make the area especially attractive for the manufacture of rayon and cellulose acetate or similar plastics.

Cotton by-products, such as hull shavings and gin waste, offer opportunities for making high-quality bond writing papers by a recently perfected process. Cottonseed hulls, corn cobs, corn stalks, oat hulls, straw and other cellulose agricultural wastes also are available in this region as raw materials for making phenolic plastic molding compounds.

Cotton linters are the basis of large rayon and plastics operations at Nashville, Elizabethton and Kingsport. The plants at Memphis and Chattanooga which process these linters into chemical cotton are among the largest in the South.

A host of other industrial raw materials can and undoubtedly will be taken from the topsoil of Tennessee, just as coal is taken from beneath it. Tennessee welcomes this marriage of manufacturing and agriculture, for it is prepared to supply the factories' demands.

The old nostalgic "garden patch down on the farm," producing garden truck or "sass" for farm tables, has been turned into big business.

The Census of 1940 estimated that farm products raised and used in this way had a value, at farm prices, of \$49,151,176. This figure is unquestionably much higher today, for it was taken during the formative days of the nationally admired Tennessee Home Food Supply Program.

The program, sponsored and activated by former Governor Cooper, dramatized the value and stimulated the planting of such gardens as ready and economical sources of well-balanced diets for the farm family and a direct strengthening of the war effort.

So outstanding has been Tennessee's leadership amongst the states in comparable programs, frequently copied from Tennessee's, that the then Governor Prentice Cooper was early selected for the national chairmanship of the Victory Gardens Committee.

The purpose of the Tennessee Home Food Supply Program, started in January, 1940, was to encourage every farm family to grow and preserve at least three-fourths, or as much as possible, of the kinds and



amounts of food necessary to a healthful diet throughout the year. Its sponsors said, and have not been refuted, that a family so doing need not worry about depressions.

State departments and agents gave generous assistance in demonstrations and advice as to how to get the best and the most of the greatest variety of foods from each type of soil and plots of varying sizes. In the first year of the program, 61,000 Tennessee families enrolled; by 1944 the membership totaled nearly 215,000.

Certificates of merit are awarded, often personally by the Governor, to those families which raise the required three-fourths of their food. By the end of 1944, nearly 100,000 certificates had been presented.

The program, discussed with warm favor everywhere, helped greatly to encourage the planting of Victory gardens by non-farm families. In 1944 these gardens numbered 181,076. These, with the farm gardens entered in the program, gave Tennessee 396,028 gardens producing for home tables, or one garden for every seven persons, big and little, in the State.

Tennessee can, and a considerable proportion does, feed itself well.

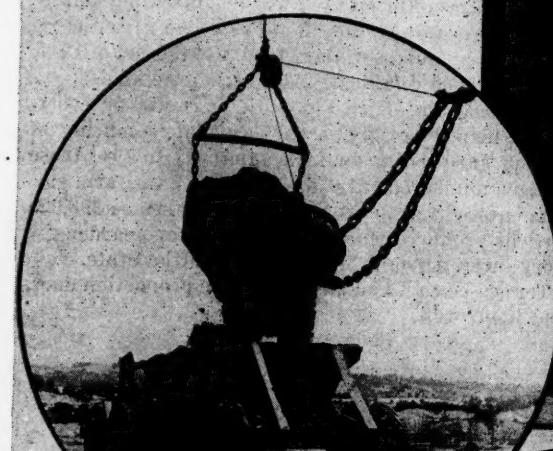


Above—Tennessee dairy herd.

Right—Tobacco.



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Assembling dive-bombers.

Making Tennessee furniture.

Until quite recently it was generally accepted that more of Tennessee's citizens were engaged in agriculture than in any other of the State's economic pursuits. On Nov. 8, 1944, in a more or less unexcited bulletin saying extraordinary things, the State Labor Department first challenged this traditional concept.

"Manufacturing," it said, "now appears to be the predominant source of employment in the State."

By cautious estimates, agriculture has lost 15% of its workers to the armed forces and to construction, manufacturing and other non-farming activities. Manufacturing, according to summaries of reports to the Unemployment Division of the State Labor Department, has expanded rapidly and currently employs 276,800 persons, making it probably the largest employing classification in the State.

In value of products, manufacturing has long exceeded agriculture. Comprehensive figures are not available, as war-time security provisions have dictated the withholding of employment and production totals of certain of the State's great industries devoted largely to war production; but of those industries for which figures are at hand, three alone—food and kindred products, chemical and textiles—turned out in 1939 products valued at \$352,781,974. Agriculture's total yield was some \$40 million less.

The 1921 output of manufactured products was \$65,741,045 and was then considered a respectable attainment, but in the ensuing 18 years Tennessee manufacturing had become 11 times greater, its 1939 products being valued at \$728,087,825. It has been estimated that of this figure, some \$320,341,902 represents the extra value given the State's raw materials by local processing.

Tennessee's amazing industrial growth is further portrayed dramatically by otherwise dry Census fig-

ures. Whereas manufacturing now occupies more than one-quarter of a million workers, in 1939 there were only 131,874 so engaged and in 1921 a mere 75,446.

In 1939, the last year for which accurate figures are available, 2,289 manufacturing plants were operating in the State.

Excluding those industries whose figures remain confidential, and basing comparisons on 1939 tables, the processing of food and kindred products provides Tennessee with outstanding dollar value in manufactured products. Tennessee is a leading producer of dairy products, its total production of food products, amounting to \$141,123,069 in 1939.

Second in industrial importance in the State is the chemical and allied output. Dollar value of Tennessee's chemical and allied production is highest in the South. Tennessee's chemicals brought \$128,011,008 in 1939, and 15,184 workers were so employed.

The Tennessee phosphate fields second largest producers of phosphate in the United States, not only have made the State the world's greatest center for the production of elemental phosphorus, but also have provided the foundation for an extensive chemical processing industry devoted to the production of superphosphates for fertilizer purposes, monocalcium phosphate, and other phosphatic chemicals. Some twelve plants

representing well-known fertilizer and chemical interests are engaged in this industry, chiefly in processing of the raw phosphate.

The plants at Memphis and Chattanooga which process cotton linters into chemical cotton are among the South's largest.

Large-scale production of acetic acid and methanol by wood distillation is carried on at Kingsport, the



Baled cotton enroute to Memphis, world-important cotton market.



NASHVILLE

acid being used in the manufacture of "Tenite," the well-known cellulose acetate plastic, and of rayon and cellophane.

The metal-producing groups, with a 1939 production totaling \$96,906,282, comprise Tennessee's third greatest industry in point of dollar value of products. To illustrate the State's many-faceted industrial make-up, only four Southern States—Alabama, Maryland, Missouri and West Virginia—had greater metallic outputs.

In iron, steel and related goods, Tennessee employed 11,441 workers in the making of \$40,604,690 worth of products.

Tennessee's shipments of non-ferrous metals totaling \$63,046,338 was equalled by no other Southern State.

As far as available figures reveal, the cotton woven goods and cotton yarn and thread industries of Tennessee employ more workers than any other industry

although their 1939 output of \$83,647,897 in merchandise ranks them collectively as fourth in dollar value importance. These two industries, working side by side, together employed 33,562 persons more than twice that of any other industry.

Tennessee's growth in these manufactures has been over four-fold since the turn of the century, the number of spindles in place in 1942 was 531,756 as opposed to 123,896 in 1900.

Fifth in Tennessee's industrial make-up is mining, with a 1941 yield of \$56,301,592. This is discussed in the section devoted to Minerals.

In turning fabrics and similar materials into apparel and other finished products, the State in 1939, in 95 plants employing 14,193 persons, sent products worth \$48,760,856 to market.

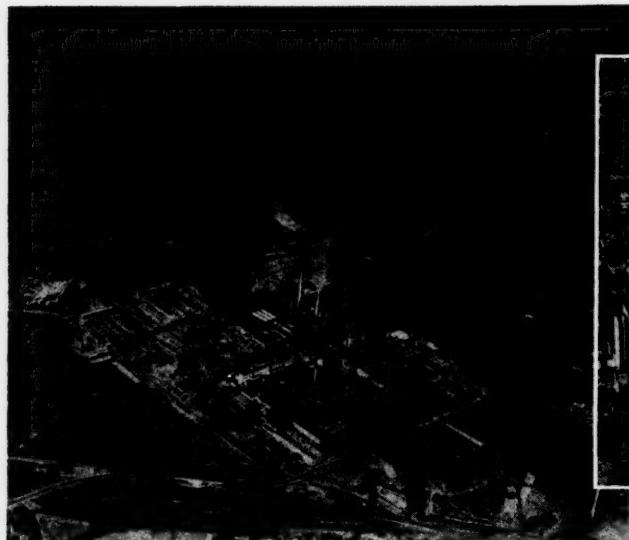
Tennessee is the largest producer of hardwood timber products in all the South. At Memphis, the wood-working center of the State, is located the world's largest producer of hardwood flooring. In addition to flooring and other lumber products, Tennessee wood manufactures include fruit and vegetable containers, boxes, furniture, cabinets and caskets.

In 1941, Tennessee was the South's third largest producer of furniture and other finished lumber products. Furniture manufacture centers around Memphis and Chattanooga. The State's total pre-war furniture production was about \$20,000,000 annually.

With timber as a basic material, Tennessee's 2,041 lumber mills sawed, in 1942, 742,865,000 board feet of hard and soft woods, which provided material for the State's 326 wood-working establishments and, using the 1939 figure as an indication of the scope of this industry, a yield in products worth \$39,117,528.

Five of the 16 pencil manufacturing plants in the United States, drawn by Tennessee's world-famous red cedar, have plants there. In normal times, pencil blanks of Tennessee red cedar are exported to European pencil manufacturers. Other wood consumers of the State include numerous cooperage and tool handle plants, pole and tie creosoting works, veneer

Left—Chemical plant at Old Hickory.



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Tennessee's printing, publishing and allied industries, in 1939, covered 267 firms, employed 3,887 and marked up \$25,630,306 in their books.

The production of paper and allied materials, as of 1939, made a sizable contribution to Tennessee's industrial worth. Thirty-three mills turned out \$18,608,486 in products during the year.

Although chemurgy with its daily surprises in demonstrated possibilities is still in its infancy, Tennessee is already an outstanding producer of cellulose acetate plastics.

In west Tennessee, where the bulk of the State's cotton crop is grown, cottonseed pressing and subsequent processing of the oil into shortenings, oleomargarine, salad oils and soap comprise a major industry. Memphis is the center of cotton oil processing.

A considerable proportion of this country's aluminum is refined in Tennessee. The country's largest aluminum producer, with its main plant near Knoxville, provides much of this light but sinewy metal for our armament, but the quantities shipped from Tennessee or the number of workers engaged are closely guarded Military secrets.

Tennessee's aircraft factories, such as the great development at Nashville, are likewise fertile in war material production. These figures, too, are restricted.

Tobacco manufactures in the State include pipe and chewing tobaccos, snuff and nicotine extract. Based upon the State's average annual yield of over 100,000,000 pounds of tobacco, the manufacturing end produced merchandise was worth \$21,509,665 in 1939. Large plants are at Memphis, Clarksville and Nashville.

The successful large-scale production of dinner-wares and electrical porcelain at Erwin and Knoxville, respectively, bring the State millions of dollars, and the glass sands occurring abundantly in the Cumberland mountains are used at Chattanooga by one of the country's largest bottle-making plants.

Other leading industrial endeavors in Tennessee are leather and leather products, including boots and



MEMPHIS

shoes, with a 1939 production worth \$21,991,993; autos and equipment, \$20,796,801; machinery (exclusive of electric), \$11,090,088; and rubber products, petroleum and coal, electrical machinery, and transportation equipment.

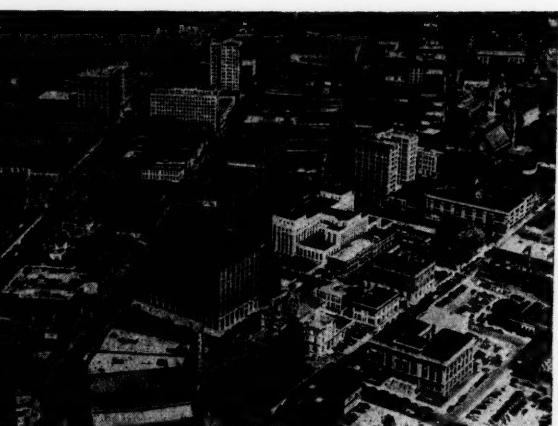
Thus, throughout Tennessee men are busy planting crops and mining the earth's inner valuables to supply industry's wants, and industry, with the abundant, versatile raw materials giving incentive, has become great as is a river with many tributaries. It is a place of industrious hands, spinning wheels, lofty smokestacks and ambitions, adroit minds.

But the present, though tremendous are its creations, is but a minor part of what the future holds.

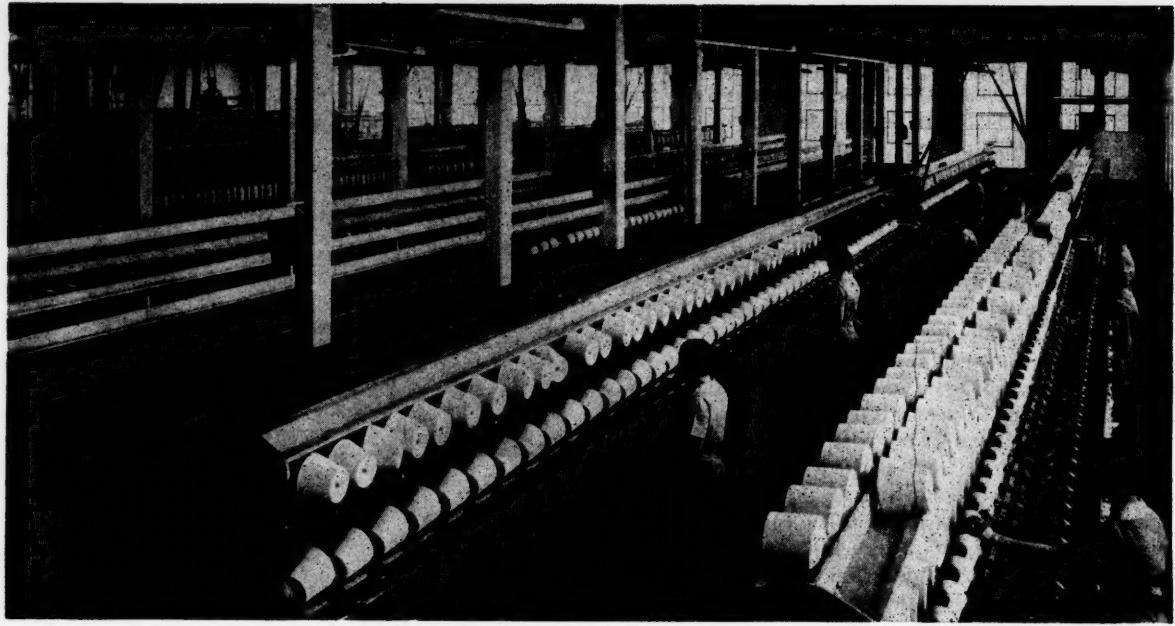
The State's mineral wealth gives an unqualified assurance of industrial expansion. The phosphate industry doubtlessly will sponsor a progressive growth, particularly in the smelting of phosphate for production of elemental phosphorus. Phosphorus and its compounds have many and varied uses, both chemically and metallurgically, and this element, owing to lower cost through electrothermal production, is steadily increasing its industrial markets.

As industrialization advances in the South, particularly the industries with large electric-power requirements, local manufacture of copper electrical equipment will become economically desirable. The possibility of electrolytic refining of copper in Tennessee, especially in view of the availability of TVA power, deserves further investigation. Such production of refined copper in conjunction with zinc, potentially available from zinc ores now mined in the State, could form the basis for new brass industries in Tennessee.

The refining of local zinc ores, all of which is now conducted without the State, offers enticing possibilities, and in view of present strong industrial shifts to the South, appears a certainty. Refined zinc, if locally available, could be used in conjunction with copper, available from the Ducktown area, to establish brass industries for the manufacture of valves,



CHATTANOOGA



Textile manufacturing ranks high in some Tennessee communities.

gears, tubing and other equipment needed in the industrial South. The zinc also might be used with barite, currently produced in Tennessee, in the manufacture of lithopone, an important paint pigment.

Essentially undeveloped are large proved reserves of sedimentary kaolin and numerous deposits of bentonitic and related clays suitable for oil bleaching. Recent experimental research indicates that these kaolins are valuable for the recovery of aluminum and may, in the future, result in new metallurgical developments.

The ceramic wares trade, already active in Tennessee, is expected to multiply. The presence within a small area of practically all the needed raw materials—the ball clays and other high-grade ceramic clays, and feldspar and flint from an adjacent state—permits a minimum assemblage cost.

Tennessee mineral resources offer major opportunities to the chemical process industries, one of the South's fastest growing branches of industry. Production of a wide variety of chemicals and allied prod-

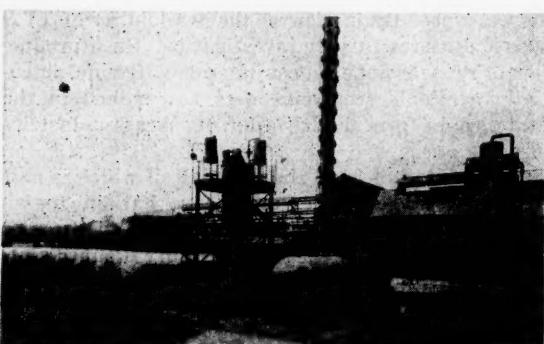
ucts can be based on the limestone, coal, water, and hydroelectric resources of the State. Among the more important of these possible products are plastics of the urea, phenolic and vinyl acetal types, nylon, synthetic rubber, calcium carbide, cyanamid, ammonia, nitric acid, formaldehyde, methanol and other alcohols, dry ice, dyes, phenol and other coal-tar derivatives. In post-war days, sulphuric acid, an essential intermediate in many chemical processes and one of Tennessee's chief minerals, would be available to local chemical process industries.

By importation of salt, such additional chemical products as acrylic plastics, caustic soda, soda ash, hydrochloric acid and numerous other allied compounds might be manufactured in Tennessee. Salt obtained from Louisiana and Texas sources could be moved directly and economically to Tennessee plant sites by inland waterways.

The vast stores of brown iron ore, now used in the production of ferro-manganese and high-silica and charcoal pig iron, warrant an expectation of greater and more diverse use in the near future. Coal, limestone and iron ore, an industrially desirable combination, occur in relative proximity along the east front of the Cumberland Mountains.

Tennessee's 55 economically important minerals are indeed, a lure and a spur to enterprising refiners.

Development of chemurgic industries is particularly favored for West Tennessee, because it is dominantly an agricultural region to which many types of crops are adaptable. In other regions of Tennessee, chemurgic industries are offered one or more crops capable of supporting extensive operations.



Left—Tennessee still house, chemical building.

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West Tennessee, as the most extensive producer of cotton, is a logical location for new chemical process industries based on cotton or cottonseed as raw materials. The availability of alpha cellulose and acetic acid in the Memphis area make it especially attractive for the manufacture of rayon and cellulose acetate or similar plastics.

Cotton by-products, such as hull shavings and gin waste, offer opportunities for making high-quality bond writing papers by a recently perfected process. Cottonseed hulls, corn cobs, corn stalks, oat hulls, straws, and other cellulosic agricultural wastes also are available in this region as raw materials for making phenolic plastic molding compounds.

Tennessee's large tobacco production seems to offer definite industrial possibilities, in view of recent researches which indicate that fiberboard, wrapping paper, varnish, soap, fertilizer, and such chemical products as nicotine, fufural, and malic, citric and ovalic acids can be produced from available low-grade tobacco and stems.

As an outstanding dairy State and the center of a large textile industry, Tennessee should prove to be a most advantageous location for the manufacture of Aralac, a new synthetic textile fibre made from skimmed milk; for casein products such as acid casein for paper coating and rennet casein for plastics, or for lactic acid products.

Similarly available in other parts of Tennessee are farm crops adaptable to chemurgic development. Sweet potatoes and Irish potatoes could yield starch, and dehydrated sweet potatoes, increasingly in demand for cattle feed, offer a possible by-product to root starch manufacturers.

The soybean, a relative newcomer to Tennessee, is rapidly expanding in acreage in West Tennessee. Today, industrial use of the soybean in Tennessee is essentially limited to extraction of its oil content but this versatile legume has tremendous future industrial potentialities in the manufacture of synthetic rubber and textiles, plastics and a host of other products. Eventually, the soybean may become the basis of new industries in the State, as cotton has been to

the rayon and plastic fields. Industrial developments in the use of soybeans have their parallel in many other farm crops.

Tennessee, with its abundant and varied timber resources and its well-established lumbering, woodworking and wood-based chemical industries, is especially adapted as a location for the additional development of new wood-consuming industries.

Plywood, prefabricated housing, built-up and resin-bonded lumber, fire-resistant wood, chemical drying of green timber, and chemical treatment to render wood sufficiently flexible for bending and shaping are only a few of the techniques and processes that open new horizons for Tennessee industry.

Chemical treatment of wood yields chemicals of great value, and in this field Tennessee is well equipped to prosper. Cellulose and lignin, chief components of wood, are the most abundant raw materials in the world, and Tennessee industries of tomorrow will make many new products from them.

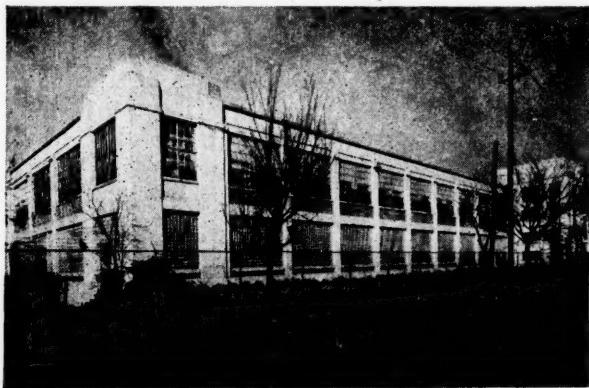
Industry will also find financial encouragement in Tennessee. As of December 31, 1943, the State had 294 strong, industrially-minded banks, sufficient to care for any reasonable needs of industry. Of these, 225 are State and 69 National banks. In the aggregate, their deposits totaled \$1,172,894,000, total resources \$1,380,590,000, and total capital accounts \$74,811,838.

Upon only a cursory inspection, a manufacturer, seeking the best available site for the plant he plans, is immediately drawn to Tennessee. There is the market for his goods nearby, with over half the Nation's population within 750 miles of the State, enabling him to send his wares to the consumer advan-

Right—Making dinnerware from Tennessee clay.

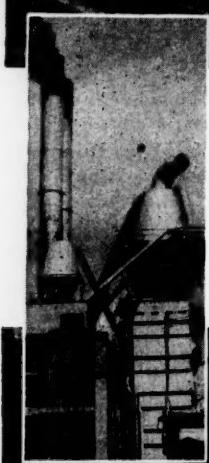
Lower Right—Bottling Tennessee chemicals.

Below—Tennessee mercerizing plant.





Above—Sawmill manufacturing plant.

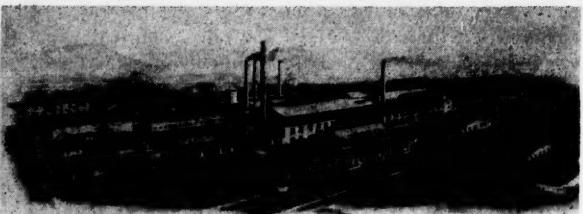
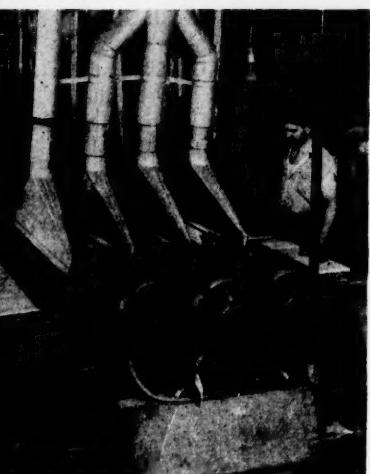


Right Above—Glass bottle plant.



Left—Hardwood lumber mill.

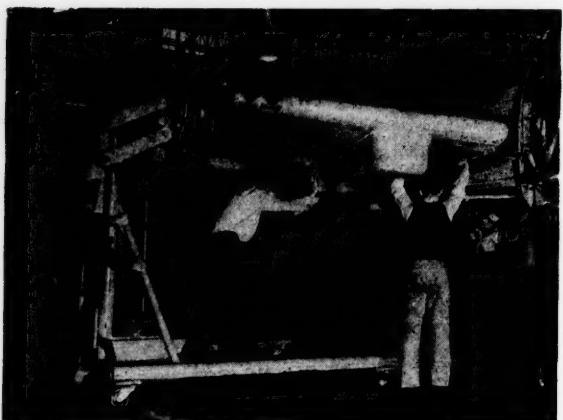
Below—Producing wood floor blocks.



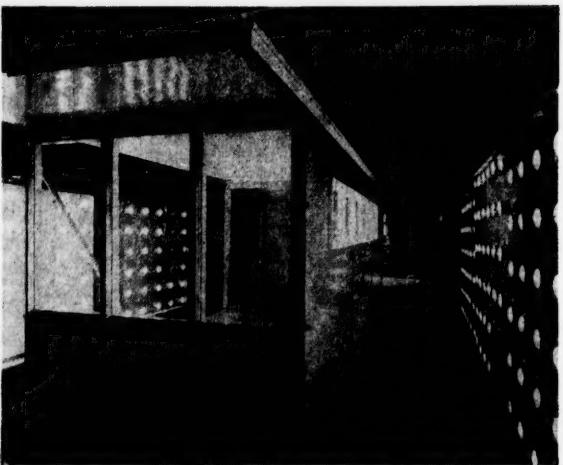
to value of finished products indicate Tennessee's industrial production is valued in billions.

During the period, July 1, 1940-June 30, 1944, privately financed manufacturing facilities, new and expanded, totaled \$89 million, while Federally financed ventures totaled \$272,000,000, assuring a substantial plant structure for post war manufacturing. That Tennessee's industries play an enormous part in war production is easily noted in War Production Board's figures revealing nearly \$2 billion in supply contracts and facility projects through June, 1944.

Below—Tennessee airplane manufacturing.



Below—Infrared light being used to dry prefabricated house sections in Tennessee.



tageously. There are the raw materials with which to work; an abundance of cheap power, the rate for hydroelectric power being lowest in the eastern United States, the goodly fund of capable labor, the temperate climate which encourages better production, and the competent, knowing assistance furnished eagerly by State, Federal and private agencies.

Tennessee has become an industrial giant but has yet to reach its full stature.

Tennessee's gigantic industrial strides of the past few years may be fully comprehended through comparison of Census Bureau figures for 1939 with other data available at this time. The Bureau in 1939 tabulated 2,289 industrial establishments employing wage earners who produced goods valued at \$728,087,825. Payrolls for that year totaled \$109,661,779.

Many figures on production, number of workers and values, are now restricted for security reasons, but there are enough publishable statistics to make a reasonably accurate comparison on the present with 1939. Social security taxes collected in Tennessee for the fiscal year ending June 30, 1944, show payrolls to have passed the \$700 million mark. Ratios of payrolls

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MINERALS

J. B. Killebrew, secretary of the Tennessee Bureau of Agriculture in the 1870's wrote in 1874: "It is observable that while some States have more copper, others more iron, and some more coal, etc., no one probably has such a great variety of mineral wealth and in workable quantities. Tennessee indeed may be compared to a grand museum in which nature has gathered a great diversity of rocks, solids, plants, minerals, physical features and climatic influences, all classified and ready at hand for such purposes as they may be suited."

Tennessee has at least 55 known minerals in sufficient quantities to have industrial significance. Its total normal annual production of all minerals has a value in excess of \$65,000,000.

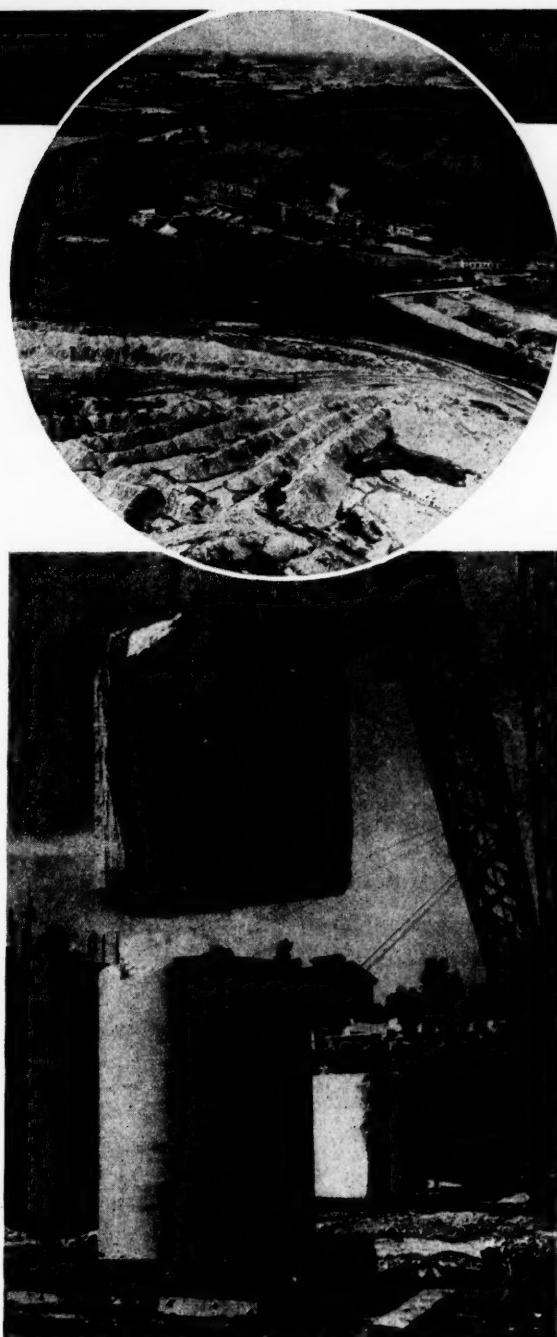
This great wealth of minerals, combined with abundant low-cost power and fuel, excellent transportation facilities and strategic marketing range, has made Tennessee one of the outstanding industrial States of the South. Process industries, based chiefly on Tennessee's mineral and power resources, number 280 operating plants in which over 25,000 people are employed.

In the production of aluminum, sulphuric acid, phosphate, zinc ore, ball clays, marble, barite and manganese Tennessee is one of the Nation's three top-ranking producers. Other leading mineral products of the State are coal, cement, crushed stone, sand and gravel, copper and lime.

The State's most important mineral is coal. It accounts for nearly one-third of Tennessee's normal production value in minerals. In the Cumberland Mountains, situated between the great Tennessee Valley of the eastern section and the Central Basin of middle Tennessee, are 4,400 square miles of coal-producing fields. Here more than 500 mines annually produce over 7,000,000 tons of coal. Reserves are estimated at 25 billion tons.

Most of the mines produce excellent coking coals suitable for metallurgical purposes. Many of the coals are steam types, highly favored for industrial steam-power generation. Accessibility of Tennessee coals, with only short hauls to every section of the State, makes possible low-cost power for industry and economical heating of plants and homes.

Tennessee, the world's leading producer of elemental phosphorus, ranks second among the States in its yield of phosphate. In 1943, 1,309,059 tons were taken from its mines in the waist of the State. Its energetic phosphate industry produces chiefly, in addition to elemental phosphorus, superphosphates for fertilizer, and monocalcium phosphate and other phosphatic chemicals. The towering furnaces, using the economical electrothermal process, have the greatest aggregate capacity for phosphorus production in existence.



Candora marble column section.

Recent studies by the State Division of Geology indicate that the proved or semi-proved phosphate reserves of Tennessee are alone adequate to meet current rates of consumption for over 200 years.

The processing and sacking of Portland cement likewise keeps thousands of Tennesseans profitably busy. In 1943, the State distributed 3,082,345 barrels.

Only Tennessee, of all the Southern States, produces copper. "Blister copper" is smelted locally, but all subsequent refining and fabrication currently is



Left—Iron ore operations in Tennessee.



Right—Another Tennessee mineral.

done outside the State. Copper in commercial quantities is confined to Polk County, the largest producer of copper and sulphuric acid east of the Mississippi. Both gold and silver are by-products of the smelting.

In eastern Tennessee, zinc mining has attained a scope putting the state among the chief producers of the country. Annual production is about a million tons of ore. None of it is smelted or refined in the State, but in view of present strong industrial shifts to the South, future local refining of zinc seems assured. Neighboring copper pockets have aroused the interest of brass and bronze equipment manufacturers.

Another of Tennessee's prominent mineral products is sulphuric acid, a by-product of copper processing. Approximately a half million tons are derived annually, with most of it being used by the State's extensive rayon, phosphatic fertilizer and munitions industries.

The ceramic clays mined in western Tennessee are universally acknowledged as being among the world's finest. About 45 per cent of the Nation's output of ball clays is mined in that one area. The local ceramic industry has a fat prosperity. Within a small compass are found nearly all the raw materials, the ground feldspar, flint and kaolin, it needs. From this rare cornucopia the large-scale manufacture of high-quality dinnerwares at Erwin and of electrical porcelains at Knoxville has developed.

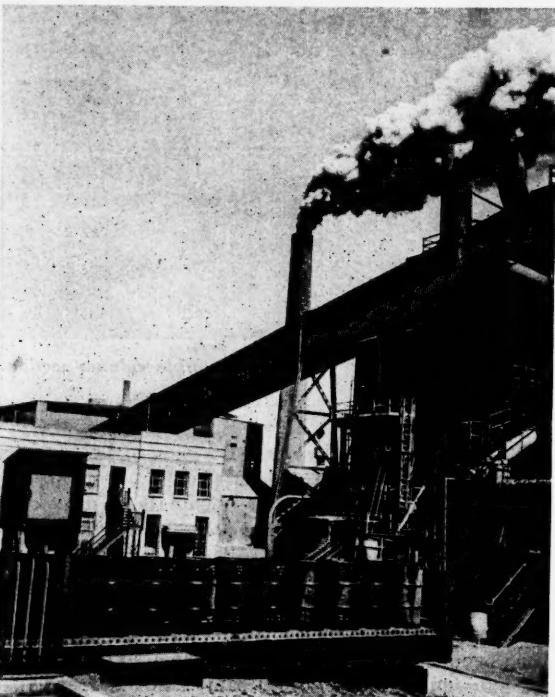
Shales, underclays and other ceramic-type clays are available throughout Tennessee. An active heavy clay wares industry is based upon them. Lying almost untouched by man are numerous deposits of bentonitic and related clays suitable for oil-bleaching. Sedimentary kaolin, in large known reserves, has been used experimentally for the recovery of metallic aluminum.

Limestone is the State's most extensively distributed rock, its stores of high-calcium limestone being regarded as unlimited. It occurs, in heaviest pockets, along the slopes of the coal-bearing Cumberland Mountains.

Tennessee marble and granite have long been popular with architects. Beds ample enough to yield block building stones are found largely in the eastern section around Knoxville. One particular bed of marble, known as the "Holston," provides most of the commercial output.

Although the greater part of Tennessee's over-all mineral yield is contributed by 10 minerals, a score or more of others are mined in worthwhile quantities. The State's output of manganese and barite, for example, were respectively the second and third largest in the Nation in 1939.

Hematite, limonite, magnetite and spathic, the principal iron ores, all occur in commercial quan-



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tities in four distinct belts. Tripoli and brown iron ores in deposits offering stimulating possibilities are at hand. Known reserves of brown iron ore are estimated at 15,000,000 tons.

Eastern Tennessee bulges with dolomites, some of which are of nearly theoretical purity and suitable for use in recovering metallic magnesium. The local production of ferrosilicon is presently prompting the erection of plants for magnesium production from these dolomites by the electrothermic ferrosilicon process.

In lesser troves Tennessee has barite, banxite, galena, slate, petroleum, natural gas, alum, chert, lead and celestite, the last being the most recent mineral discovery.

The mineral and corollary industries are well aware of Tennessee. The beckoning jewels within Tennessee's bosom will surely attract prolific foundries and factories.

Extending as it does from the Great Smoky Mountains of the Appalachians westward to the Mississippi River, Tennessee includes eight well-defined physiographic provinces, or topographic divisions. These conform to the geologic structure of the underlying rocks. The plains and plateaus have developed on areas of essentially horizontal rocks. The highly folded strata culminate in the mountainous regions in the eastern part of the state.

Rocks of the Great Smoky province are the granite, gneisses, schists, slates, shales, sandstones, conglomerates and quartzites. With exception of certain iron ore deposits (magnetite), cope and phosphate, the mineral resources of the Great Smoky region have been little developed. Included are deposits of beautiful granite, slate, marble and other building stones. The valley of East Tennessee, which lies immediately west of the foothills of the Great Smokies, and is the area included in the program of the Tennessee Valley Authority, is the seat of Tennessee's marble and zinc industries and the source of many economic products.

The Cumberland Plateau is a tableland with a general elevation of 2,000 feet and is capped with essentially horizontal beds of sandstone and shale. The steep crags, overlooking the Valley of East Tennessee give the name of Cumberland Mountains to the entire plateau. This is the coal area of the state and contains many beds of excellent coal up to 7 feet thick. The red hematite of the Birmingham district extends up the entire eastern edge. Oil and gas are produced in commercial quantities in two counties.

Mineral resources of the Highland Rim at the foot of Cumberland Plateau include the large deposits of brown iron ore with many high calcium lime plants scattered throughout the region. Building stone, phosphate rock, chert and manganese are part of the rim resources. Oil is also produced in commercial quantities here. The famous phosphate rock deposits are in the Central Basin, sometimes called "the dimple of the Universe," where also are sand and gravel, building stone and oil shale.

The Western Valley flanks the Tennessee River in its journey across the state. Its minerals are chert, building stone, sand, gravel, phosphate rock. Mineral resources of the plateau slope of West Tennessee in-



Above—Crab Orchard stone.



clude high grade clay deposits, embracing the bleaching varieties, and sand and gravel. An important resource is the abundant underground water.



-- FORESTS

Nearly fifty percent of Tennessee's total land area is classified as forestland. This slumbrous woodland, in which the lumberman's axe has bitten deeply, yet whose scars are mostly invisible beneath new growth, comprises nearly 13,000,000 acres, of which 12,555,000 acres were classified (1940) as commercial forest areas.

Fine lumber for quality furniture, rough timber for construction, cordwood for fuel and processing; Tennessee takes nearly all its needs in products of the forests from within its own boundaries. There are cypress, southern yellow and white pines, cedar, spruce and hemlock among the softwoods; oaks, yellow poplar, tupelo, black and red gums, beech, birch, elm, ash, hickory and maple among the hardwoods.

About 2,670,000 acres have been worked over for a

total income of hundreds of millions of dollars, but time and nature have mostly replaced what man has taken away, and these sections, now listed as "second growth saw timber," are again mature and ready to yield another rich crop.

A steady flow of cordwood for stoves, furnaces and chemists' vats is produced from 6,275,000 acres. This extensive area comprises 4,337,000 cords of softwood and 17,250,000 cords of hardwood. In addition, in the saw timber areas, there are 6,600,000 cords of softwood and 26,400,000 cords of hardwood, making a grand total of 54,587,000 cords on all commercial forest land.

Conservation measures and reforestation are actively practiced to not only maintain but to increase Tennessee's store of the raw material of the forests. In the past few years, 20,500,000 forest tree seedlings have been propagated and distributed for reforestation, and the "tree farmers" have been instructed and assisted in improved forest management. In recent years, the State has increased its forest preserves from 40,140 acres to 291,861 acres. The largest and most notable of the new acquisitions is the 63,000 acre Catoosa Park in Cumberland and Morgan Counties.

In 1942, Tennessee's 2,041 lumber mills turned out 742,865,000 board feet of lumber, of which 259,764,000 were softwood, 483,101,000 hardwood.

In 1939, according to the last Census of Manufactures, there were 326 plants in Tennessee, exclusive of those working chemically, which used lumber as a raw material. Their products were valued at over \$39,000,000.

It was estimated in 1940 that Tennessee had a treasure of 16,950,000,000 board feet of sawtimber stand, enough with man and nature's constant replacements, to maintain an industry of importance.



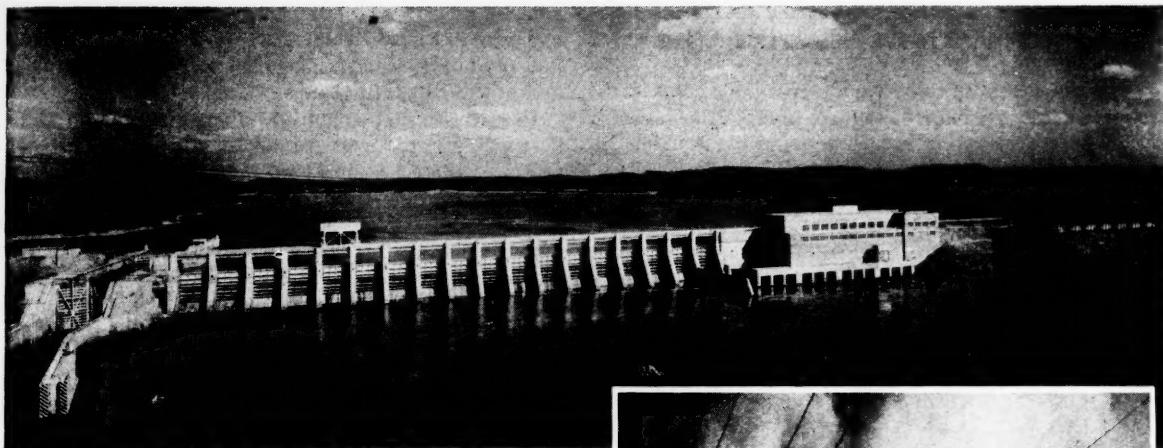
Above—Tennessee forest giants.

Right — Logs on their way from woods to finished products in Tennessee.



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Panorama of Chickamauga Dam.

Although Tennessee's coal resources, estimated at 25 billion tons in reserve, are ample to sustain an industrial empire, her unique possessions in hydroelectric power sound a call to manufacturers almost as irresistible as the song of the sirens was to Ulysses.

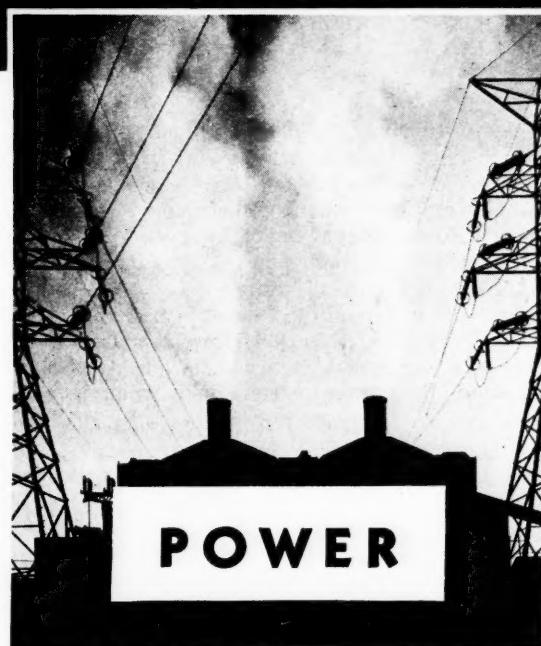
Manufacturers, though, are not stuffing wax into their co-workers' ears nor lashing themselves to masts in resistance to the call as Ulysses did. They are moving into Tennessee eagerly. And nature cooperates copiously by furnishing an average rainfall, well distributed throughout the year, of 50 inches to underwrite the State's hydroelectric wealth.

The hub and chief producer of low-cost hydroelectric power is, of course, the universally known TVA water control system. TVA is commonly thought of in terms of its three or four greatest dams, and the average visitor is astonished to learn that there are actually 28 dams under TVA control along the Tennessee River and its tributaries.

TVA's transmission lines thrust out across the State like a gigantic spider web, making adequate power available to industry of whatever size wherever it may choose to locate. The total facilities of the gigantic system, including projects not yet completed, will comprise hydroelectric plants and steam plants situated at strategic points. When the last turbine is ready to spin, TVA alone will be capable of producing 18 billion kilowatt hours of cheap power annually.

There is the "Alcoa System," pioneer in hydroelectric generation in Tennessee. The Aluminum Company of America began hydroelectric operations on the Little Tennessee River near Knoxville in 1914 and later built other generating plants. With the recent effectual integration of the TVA and "Alcoa" systems Tennessee has become the hub of one of the world's most extensive power developments.

In 1942, the last year for which figures are available, there were nine privately-owned and 29 publicly-owned public utility plants in Tennessee. In that year, privately-owned plants generated 71,824,000 hydro kilowatts and 120,701,000 fuel kilowatts. The 29 publicly-owned plants put into transmission lines 3,026,534,000 hydro kilowatts and 1,402,333,000 fuel



Watts Bar steam plant.

kilowatts. Tennessee thus produced over one-seventh of the country's hydroelectric power and nearly one-half its fuel kilowattage. With additional elements of TVA and several privately-owned generating plants getting into operation since those figures were taken, the State is today surely generating an even greater percentage of the Nation's electric power.

While Tennessee takes from the earth some oil and natural gas its yield in these power sources is comparatively meager. However, such sources are nearby in adjoining states for those industries which require them. Of cordwood, there is an almost inexhaustible supply readily at hand.

Industry on the whole, there being precious few exceptions, is more and more evaluating Tennessee's economical power resources and finding them magnetic.

Tennessee is frequently referred to as the "first public power state," chiefly because of the huge developments of the Tennessee Valley Authority. Private hydroelectric projects several decades before the

advent of T. V. A., however, formed an important milestone in the industrial progress of the Volunteer State.

Invisible genii, untold legions in number in the from of power created by the force and weight of the Tennessee River as it moves along its circuitous course through the state north to the Ohio River and then down toward the Gulf via the Mississippi, stand ready to serve Tennessee industry at the push of a button or the throwing of a switch.

Giant towers and long stretches of transmission lines span the mountains, the rivers and the farms, finally dwindling to the lesser size of the distribution systems to carry the pulsating electrical energy to industry, to agriculture and to the rural and urban areas of the 42,246 square miles of Tennessee, the state where many great dams block river waters to wrest away their power.

Electric power—steam generated and water-born—already forms the backbone of important Tennessee industries. Coupled with low-cost fuels, plentiful water resources, an equable climate, congenial labor, abundant raw materials from both under and above the earth, Tennessee power holds out a friendly hand to welcome business interests seeking industrial sites within the borders of the state.

Harnessed waters of the Tennessee River help produce more than 10,000,000,000 kilowatt-hours yearly, says David Lilienthal, chairman of the Authority, with more than three-quarters now going to war

pal power boards. Plant investment of the Memphis unit is over \$22,265,000; of the Nashville board, many millions; of the Chattanooga board, over \$12,986,000, and of the Knoxville board, \$7,260,000.

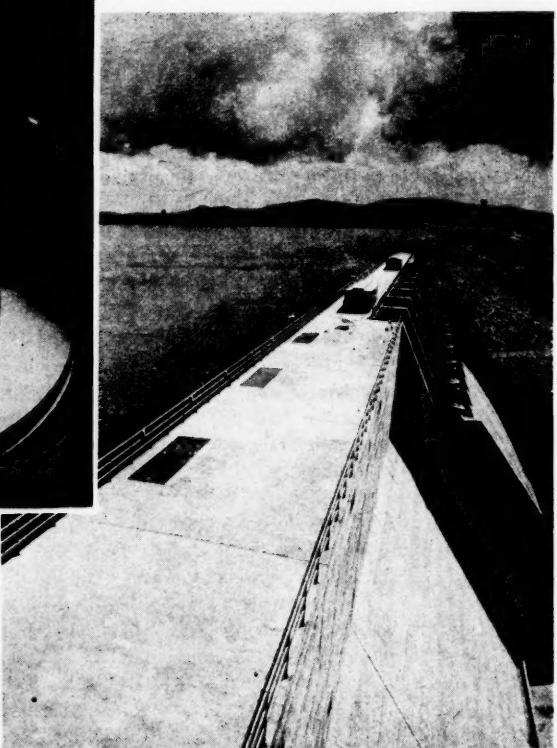
Industry has also figured importantly in the Tennessee power picture. For instance, power plant investment of the Aluminum Company of America, as of 1940, was between \$10,000,000 and \$11,000,000. Lumber and coal companies also have in the past operated facilities to serve their employes and residents contiguous to their plants and communities.

Further electrification of Tennessee rural communities is expected under the Rural Electrification Administration's post-war program. Tentative figures issued by that agency indicate that \$12,000,000 may be expended for distribution lines and \$4,600,000 for related facilities, thus to serve 57,900 consumers in the non-urban sections of the state.

Tennessee's electric power facilities have played an important part in the mobilization of that State's and the country's industrial strength for producing the materials and weapons of war. Power after the war will play just as important a part in the peacetime economy. The fact that some of the nation's largest industrial organizations, many of which require large quantities of electricity, have recognized Volunteer State opportunities, which include an ample and low-cost power supply, presage a rosy future for the area north of the Gulf states and between the Great Smokies and the Mississippi River.



Left—Pickwick Dam generators.



Below—Cherokee Dam.

plants. Norris, Pickwick Landing, Chickamauga, and Watts Bar dams are in Tennessee. A large steam-generating plant is located at the latter point, in recognition of the fact that hydro-electric power must at times be supplemented.

Tennessee's four largest cities—Chattanooga, Knoxville, Memphis and Nashville—all have municipi-

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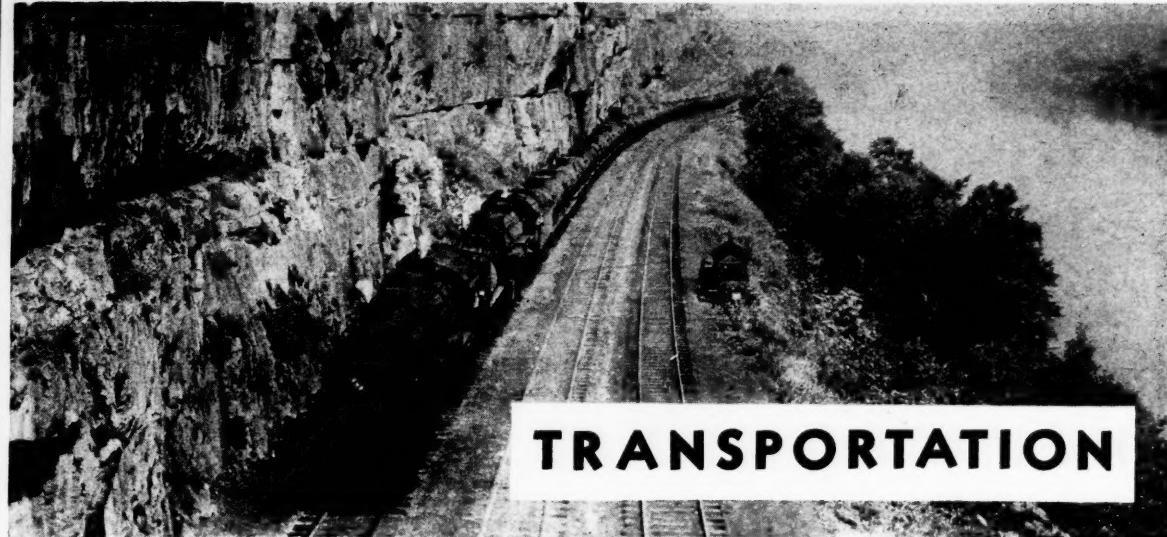
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TRANSPORTATION

Rails and water follow same Tennessee route.

Tennessee's recent industrial expansion is due to a considerable extent to its geographic desirability. Situated midway between the Great Lakes and the Gulf of Mexico, it is within 750 miles of 78% of this country's total population, 47% of its area, nearly 74% of the wholesale and 73% of the total retail trade. Transportation costs of goods to markets are thus moderate to low.

Well-developed networks of highways, airways and railways afford ample transportation facilities, and supplementing these, in no small degree, are the shipping facilities offered by three great river systems.

In railroads, Tennessee is rich. Twenty-two railroads with a total of 3,536 miles of mainline track, an equivalent of one railway mile for each eleven square miles of the State's total area, serve all but a very few of Tennessee's 95 counties. About 90% of the rail mileage is operated by eight major companies.

Trains speeding along tracks penetrating Tennessee's mountains, crossing its lowlands and spanning its rivers, mean that railroads carry many millions of tons of freight to and from the Volunteer State's mines, factories, farms and forests. Freight originating in Tennessee in 1942, the latest year for which such figures are available, totaled 21,310,251 tons; freight terminating, 27,386,739 tons.

Interstate Commerce Commission statistics show agricultural freight springing from Tennessee communities totaled 1,766,118 tons, with 2,364,373 tons terminated in that state. Tonnage of animal product freight aggregated 194,243 tons original; 220,124 tons, terminating. Products of Tennessee mines sent out over Tennessee rails amounted to 9,549,090 tons; mine product freight ending at Tennessee points, 14,467,418 tons.

Tennessee forests were responsible for 1,986,000

tons of freight, whereas 2,373,035 tons of such freight were delivered in the area between the Mississippi river and the Great Smokies. The total of freight embracing manufactured goods loaded in Tennessee was 6,157,972 tons; tons of manufactured goods, a category including miscellaneous freight, terminating on Tennessee routes, 6,649,535 tons.

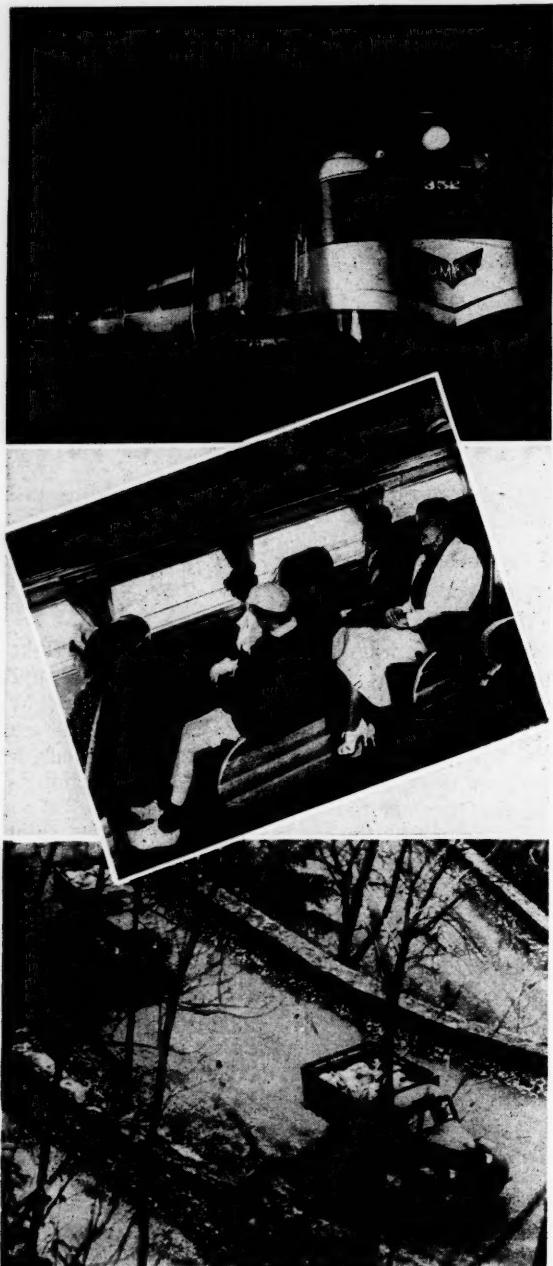
Transportation by truck is seldom found to excel that in Tennessee. Thirty-nine major carriers and approximately 392 local carriers operate more than 2,800 trucks over the State's 5,332 miles of paved highways serving every community and connecting with similar transportation to any part of the country.

The total road and highway mileage within the State is approximately 63,000 miles exclusive of city streets. Of this, the state highway system is responsible for some 7,528 miles, including over 2,230 miles of macadam, gravel or chert; 1,865 miles of concrete, and 1,334 miles of variously treated hard surface roads.

Within the past five years 2,800 miles of lesser roads have been repaired; 786 miles of these have been surfaced with an all-weather asphalt on a strong base; 750 miles of better highways have been laid. Two hundred bridges have been built. Plans for immediate post-war highways involve \$8,000,000,



Right—A Tennessee highway.



The Tennessee State Highway Commission was created in 1915 and up to 1944 the State had spent approximately \$300,000,000 on its highway system. In addition to development of its arterial system, Tennessee has connected all county seat towns by state highways.

Five major airlines operate in Tennessee with port facilities in principal cities. Many huge airports now manned by the fighting forces doubtless will augment existing facilities for air express and freight. All lines have overnight schedules from Tennessee to every section of the United States.

Tennessee is unique among States in that it has an inland waterway system composed of three major rivers, the Mississippi, Tennessee and Cumberland, having within the State over a thousand navigable channel miles.

With the completion of TVA's Fort Loudoun Dam, boats and barges with a nine-foot draft are able to travel up the Tennessee River as far as Knoxville, 652 miles from its mouth. This will link Tennessee River ports with the many-tentacled Mississippi River inland navigation system of 5,700 miles. It will enable economical all-water transportation of raw materials and finished products to New Orleans, Kansas City, Pittsburgh, Minneapolis and other important transfer points. From Gulf ports these materials and products continue their low-cost journeys by water to all foreign lands, permitting manufacturers to compete in those rich markets.

Water transportation is popular in the Tennessee area. Barge-loads of automobiles, gasoline, machinery and corn are not an uncommon sight. TVA has estimated that with the completion of the nine-foot channel on the Tennessee River, freight reductions will amount to \$3,450,000 each year, a sum manufacturers like to contemplate.

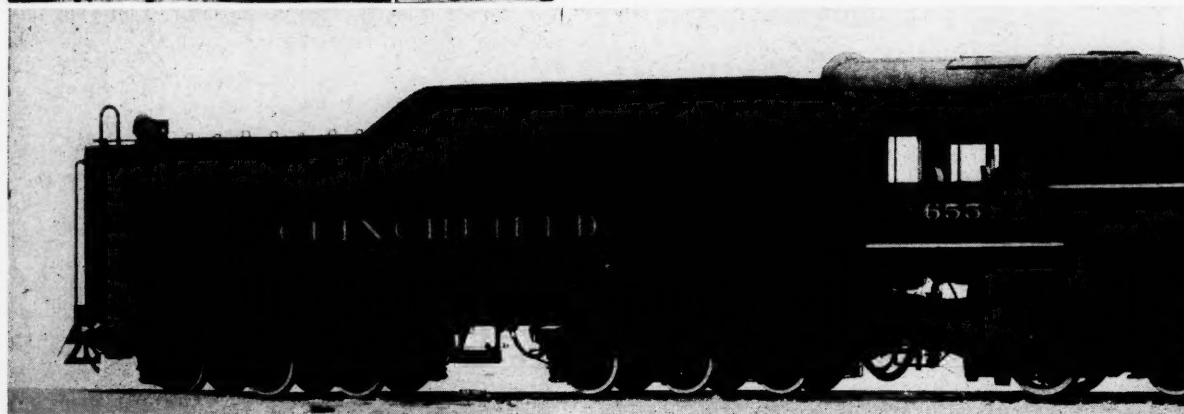
Tennessee, feeling its oats and going places, has the means to get there conveniently and economically.

Left—At top—A streamliner operating through Tennessee.

Angle picture shows interior of a super-bus.

Next—The famous "W" route.

Below—A Tennessee mountain engine.



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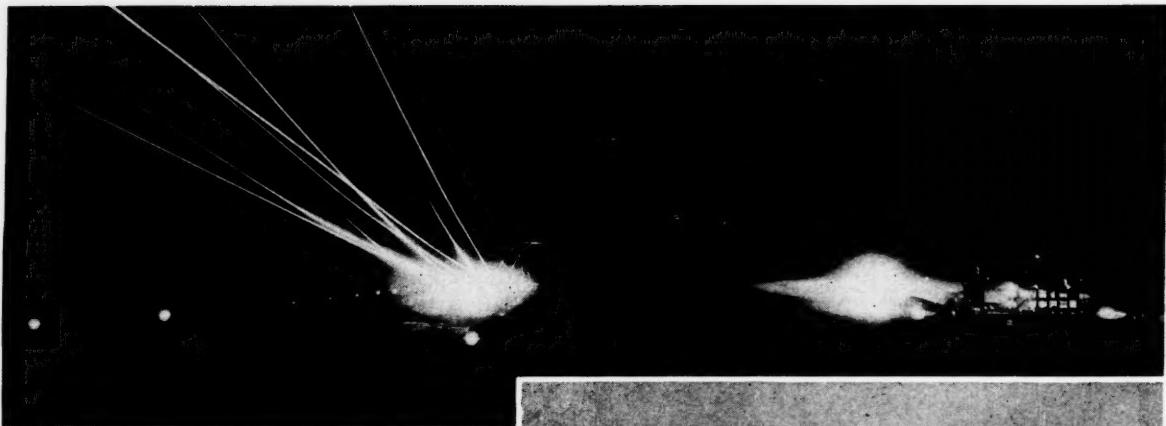
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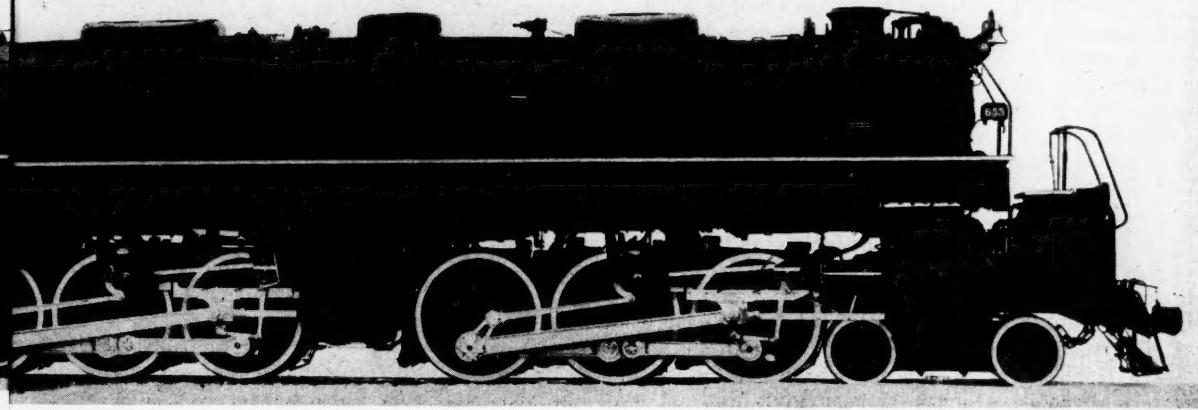
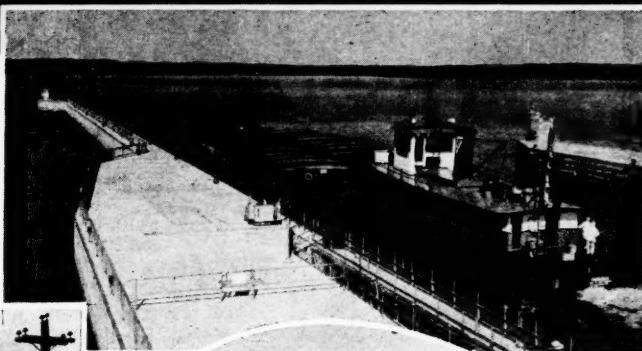
Above—Tennessee airport at night.

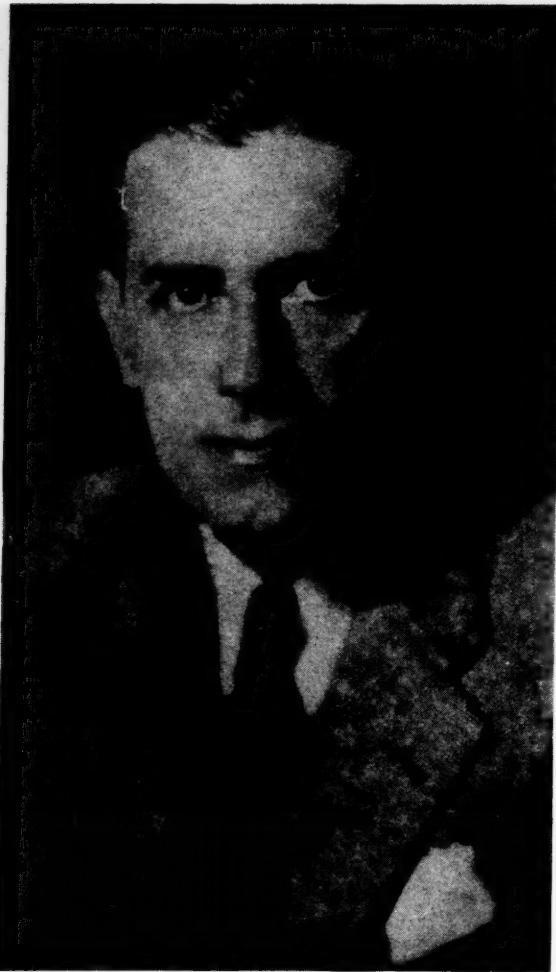
Right—Grain laden barges on a Tennessee waterway.

Below—Signal Mountain bus.

Circle—Ship on a T. V. A. lake.

Bottom—A Tennessee mountain locomotive.





Prentice Cooper, retiring governor.

-- GOVERNMENT

The Constitution of the State of Tennessee, as amended from its first Constitution, adopted in 1796, and a second, adopted in 1835, was put into force in 1870.

The Constitution's Section 1, Article 1, reminds the State officials that "all power is inherent in the people, and all free governments are founded on their authority, and instituted for their peace, safety, and happiness . . ."

The supreme executive power of the State for the last six years has been vested in Governor Prentice Cooper. He first took office on January 16, 1939, and was twice re-elected, but is prohibited from a fourth consecutive term by the Constitution's Article 3, Section 4, which provides that "The Governor shall hold his office for two years, and until his successor shall be elected and qualified. He shall not be eligible more than six years in any term of eight."

The Honorable Jim McCord, elected to succeed Governor Cooper, assumes the post this month.

In addition to the Governor, the Constitution provides for four executive officers—A Secretary of State, Treasurer, Comptroller of the Treasury and an Adjutant General.

To coordinate the various activities of the State Government, to eliminate duplication and overlapping of functions and to promote cooperation among the Departments, statutory provision has been made for a Cabinet, or Advisory Staff, composed of ten heads of executive departments—the Commissioners of Agriculture, Conservation, Education, Finance and Taxation, Highways and Public Works, Institutions, Insurance and Banking, Labor, Public Health and Public Welfare.

As the Government of Tennessee is now organized, the major continuous executive activities, with the exception of functions exercised by the constitutional offices, are performed by sixteen departments and one commission.

Four of these departments—the Department of Accounts, Budget, Personnel, and Purchasing—are primarily staff agencies; that is, their chief functions represent services rendered to and control exercised over other State departments.

The activities of the other twelve departments are largely line functions. They are carried on principally in relation to individuals and agencies not connected with the State Government. Two of this group—the Departments of Local Finance and Safety—together with the four staff departments, while separate units under the provisions of existing laws, in reality operate to some extent as divisions of the Governor's office. These six departments are headed by directors who are not members of the Governor's Cabinet, while the other ten departments are headed by Commissioners, who constitute the Cabinet.

The one Commission referred to above—the Tennessee State Planning Commission—is closely related to the Governor's office and operates as a research and planning agency for the State.

In addition to these mentioned agencies, there are a number of miscellaneous boards and commissions that perform some governmental functions.

The legislative authority of Tennessee is vested in the General Assembly, which consists of a Senate and a House of Representatives. The General Assembly convenes in regular session once every two years, opening on the first Monday in January of the odd numbered years.

The State Senate is composed of 33 members, the House of Representatives of 99 members. Both the number of senators and representatives are apportioned by the General Assembly among the several counties or districts of the State according to the number of qualified electors in each.

The Constitution provides that the judicial power of the State shall be vested "in one Supreme Court, and in such Circuit, Chancery and other inferior courts as the Legislature shall from time to time ordain and establish."

The judicial structure of the State consists of the courts with purely local jurisdiction, such as justice of peace courts, courts of general sessions, and county

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courts; regional or district courts of original jurisdiction empowered to adjudicate civil and criminal cases and cases in equity, such as circuit courts and chancery courts, including the court of appeals for civil cases and the State's highest tribunal, the Supreme Court, for both civil and criminal cases.

The State is divided into 20 circuit court districts. Judgeships are elective.

Tax collections in Tennessee for the fiscal year ending June 30, 1944, totaled \$55,563,061. Of this total, general fund expenditures accounted for \$23,935,401, or 43.08 per cent; contributions to the sinking fund, \$9,923,771, or 17.86 per cent; county and municipalities' share, \$7,575,171, or 13.63 per cent; highway fund expenditures, \$6,862,512, or 12.35 per cent. The balance was divided between highway and general fund surpluses \$3,838,130, or 6.91 per cent, to the former, and \$3,428,076, or 6.17 per cent to the latter.

The total state debt at January 2, 1945, was \$83,517,394, of which 68 per cent is applicable to highways and bridges, with 30 per cent of this figure representing direct debt and 38 per cent, county reimbursement debt. Forecasts made by Tennessee authorities indicate that the present debt will be liquidated by June, 1968.

Tennessee Banks

(June 30, 1944)

Total 293 Banks and Their Branches

Assets:

Loans and Discounts

(including Overdrafts) \$ 252,501,411.54

| | |
|---|----------------|
| United States Government obligations, direct and guaranteed | 674,533,216.77 |
| Obligations of States and political sub-divisions | 80,290,944.50 |
| Other Bonds, notes and debentures | 11,683,859.78 |
| Corporate stocks (including stock of Federal Reserve Bank) | 4,193,004.69 |

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| Total Loans and Investments | \$1,023,202,437.28 |
| Cash, balances with other banks, including reserve balances and cash items in process of collection | \$ 423,903,232.99 |
| Bank premises owned and furniture and fixtures | 14,337,235.58 |
| Real estate owned other than bank premises | 1,160,868.41 |
| Investments and other assets indirectly representing bank premises or other real estate | 242,000.00 |
| Customers' liability on acceptances outstanding | 186,445.60 |
| Other assets | 2,787,666.61 |

Total Assets \$1,465,819,886.47

Liabilities:

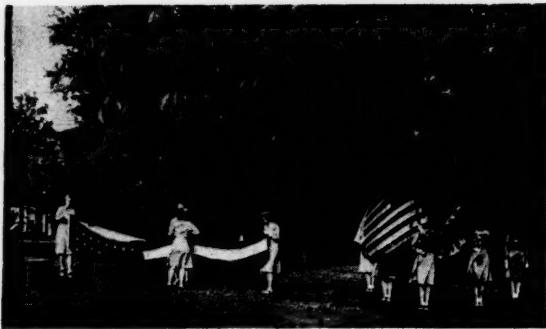
| | |
|---------------------------------|------------------|
| Capital Stock | \$ 35,821,025.00 |
| Surplus | 28,280,295.85 |
| Undivided Profits | 12,364,163.86 |
| Reserves | 4,945,380.21 |
| Deposits | 1,380,118,912.69 |
| All Other Liabilities | 4,290,108.86 |

Total Liabilities \$1,465,819,886.47

Tennessee State Capitol at Nashville.



Left—Retreat at a Tennessee girls college.



-- EDUCATION --

Tennessee's extensive, carefully designed and conducted educational system deserves the warm commendation it receives. It assures its younger citizens adequate preparation for their future responsibilities. Unspared money, time and effort, and the erudite know-how of prominent educators are devoted to the development of knowledge and character which, in the ultimate summation, give a section its power.

The census of May, 1938, revealed a scholastic Tennessee population between the ages of six and eighteen of 538,844 white and 106,960 colored youths, of whom 416,565 white and 63,006 colored potential students were in the county areas and the balance in cities.

To develop better citizens from this raw material the State maintained, as of the scholastic year ending June 30, 1943, 4,908 county elementary and 209 urban schools. Of the total elementary schools, 1,022 were for colored pupils.

Of high schools, there were 474 in the counties, 102 in cities. Ninety-three were colored high schools.

To man these institutions, the State had 16,741 teachers busy before blackboards in the county and city elementary schools, and 5,570 in the high schools.

The salaries of the teachers alone, exclusive of supervisors, principals, librarians and others not actually serving in the classrooms, was \$18,438,408.75. That every opportunity and encouragement in cultural and character enhancement is given suburban and rural students is shown by the apportionment of \$11,868,919.08 of this over-all teacher payroll to county schools.

Further aid to proper schooling is given by the operation of over 1,300 all-steel buses to transport pupils to and from schools. For lesser privileged students, the State has provided free text books for the lower grades since 1939, and has distributed about 2,000,000 of them to date.

High school graduates, seeking advanced training, have alluring possibilities spread before them in Tennessee. Within this one State are 22 universities and colleges, five professional and technological schools, 12 junior colleges and eight negro institutions of advanced learning.

The brightest academic beacon among the State-financed institutions of higher learning is the University of Tennessee at Knoxville. It was founded as Blount College in 1794. After subsequent combination with other colleges and an intervening change of names, it became the University of Tennessee in 1840.

The University's comprehensive curriculum include a Graduate School, seven colleges involving as many major subjects, five technical schools, an agricultural experiment station, an engineering experiment station, and the University's Junior College.

The State, in all, maintains eight higher educational centers.

Among the privately endowed universities and colleges, Vanderbilt University at Nashville, established in 1873, stands preeminent as a competitor with the University of Tennessee for national renown.

All of the State's public and private universities, colleges and junior colleges are co-educational excepting Ward-Belmont School, the Tennessee College for Women, and the University of the South (Sewanee) which matriculates only male students.

Tennessee's educational endeavors, however, are not confined to orthodox schooling. The State Board of Vocational Education has cooperated with local boards of education in training scores of thousands for specialized work in war production. The Board even goes to the extent of giving training requested by particular employers.

Sixty thousand students are currently enrolled for vocational training, in peacetime as well as wartime pursuits, in the 309 high schools. During the past few years about 40,000 students were enrolled in pre-employment courses and around 21,000 in supplementary courses at the State's 14 training centers.

Physically handicapped and partially mentally handicapped persons have special State, and a few private, institutions devoted to their training. Over 1,800 persons with permanent physical disabilities are now being strengthened for life's tasks under the vocational rehabilitation program.

A physical education and health program has been activated in all the schools of the State, both white and colored.

Aviation textbooks and model airplanes have been distributed, and aviation courses made available.

It has been estimated that, in gross, the far-sighted State of Tennessee expended about \$45,000,000 in 1942 on the cultural and technical improvement and the physical betterment of its younger citizens, a guarantee of trained, alert minds in healthy bodies to guide the State wisely in coming years.

Colleges and Universities

- Bethel College, McKenzie.
- Bob Jones College, Cleveland.
- Carson-Newman College, Jefferson City.
- Cumberland University, Lebanon.
- King College, Bristol.

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Bottom—

Lambuth College, Jackson.
Lincoln Memorial University, Harrogate.
Madison College.
Maryville College, Maryville.
Milligan College.
Scarritt College for Christian Workers, Nashville.
Siena College, Memphis.
Southwestern College, Memphis.
Tennessee College for Women, Murfreesboro.
Tennessee Polytechnic Institute, Cookeville.
Tusculum College, Greenville.
Union University, Jackson.
University of Chattanooga, Chattanooga.
University of the South, Sewanee.
University of Tennessee, Knoxville.
Vanderbilt University.
William Jennings Bryan University, Dayton.

Professional and Technological Schools

Andrew Jackson University, Nashville.
Chattanooga College of Law, Chattanooga.
Jackson Bible College, Kimberlin Heights.
Memphis College of Music.
Southern College of Optometry, Memphis.

Teachers Colleges

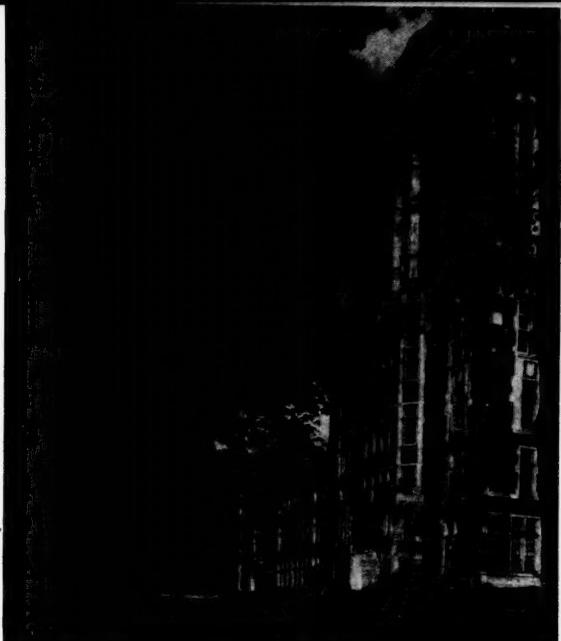
Austin Peay Normal School, Clarksville.
East Tennessee State College, Johnson City.
George Peabody College for Teachers, Nashville.
Memphis State College, Memphis.
Middle Tennessee State College, Murfreesboro.

Negro Institutions

Fisk University, Nashville.
Knoxville College, Knoxville.
Lane College, Jackson.
Le Moyne College, Memphis.
Meharry Medical College, Nashville.
Morristown Normal and Industrial College,
Morristown.
Swift Memorial Junior College, Rogersville.
Tennessee Agricultural and Industrial State
Teachers College, Nashville.

Junior Colleges

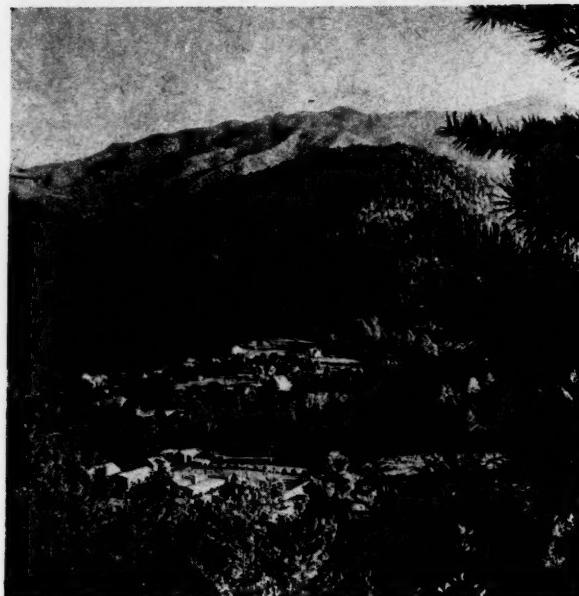
David Lipscomb College, Nashville.
Freed-Hardeman College, Henderson.
Hiawassee College, Madisonville.
Martin College, Pulaski.
Southern Junior College.
Tennessee Wesleyan College, Athens.
Trevecca Nazarene College, Nashville.
University of Tennessee Junior College, Martin.
Ward-Belmont School, Nashville.



Top—University of Tennessee.

Middle—Vanderbilt University.

Bottom—Fisk University (negro).



Above—Park on a Tennessee reservoir.

Left—Mountains at Gatlinburg.

- - RECREATION

Tennessee's recreational delights are extensive. Excepting the cold weather outdoor sports of the far north, it would be difficult to name a recreation popular with Americans that cannot be enjoyed in Tennessee. Some of its expanses of water, both natural and man-made, are so broad the occasional brisk winds whip up a surf, something usually associated only with the world's larger water areas.

Indoor amusements, the theaters, clubs and parties, are well supplied by the up-to-date cities, but Tennessee's outdoor recreational offerings draw the greater approval.

To one not conversant with the State and thinking of it as "inland," it is surprising to learn that so much of Tennessee's diversion concerns the pleasures and sports found on and in water.

In addition to the charming natural lakes of Tennessee, the dams of TVA have impounded vast reaches of water. TVA's chain of 20 beautiful, clear-water

lakes have justly been termed "The Great Lakes of the South." They have a water surface of more than 700,000 acres, nearly 1,100 square miles. Their shore lines stretch about 9,000 miles, a distance three times as great as that of the entire United States shore line of the Great Lakes to the north.

Five-sixths of this shoreline, approximately 7,500 miles, are in public ownership, assuring public access to the lakes and control of what goes on around them.

Throughout the State and carefully distributed to be convenient to all, are modern casinos providing all the pleasures of sun and surf bathing. In the translucent, invigorating waters, bathing has become a favorite pastime—and incidentally, a profitable enterprise for its entrepreneurs.

Pleasure boats, currently numbering about 6,000, roam about the thousands of miles of rivers and lakes of Tennessee. Larger cities bordering the lakes have formed yachting and boating clubs, and several outboard championship race meets were held before the war. Nor are all of Tennessee's pleasure boats motorized. Sailing enthusiasts find many waters amply large for maneuvering with mainsheets and jibs, and contend that the whimsical cross-currents of air engendered by the encroaching hills and mountains provide not only a thrill, but require a skill surpassing that of the sea-going sailor.

In the waters is a goodly stock of game fish. Trout and bass, often of a size to test the angler's best, abound in most of the rivers and lakes. To insure an even greater supply, the State and TVA maintain large fish hatcheries which continually release adolescent gamesters into chosen waters.

Wildlife technicians, comparing catches on local lakes with those on the Great Lakes, offer figures



Left—Wildlife in Tennessee mountains.

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Above—Boat races on Morris reservoir. Left—A horsewoman on a Tennessee path. The couple at the right dance at Ward-Belmont.



which show Tennessee waters to be more fertile. In 1940, Lake Erie, the richest of the five Great Lakes, yielded less than 7 pounds per acre. In the Tennessee Valley during the same year, anglers took 15 pounds per acre from one reservoir, 19 from another and 32 from a third.

Nimrods, too, need not look far for good sport in Tennessee. It is homeland for over 300 species of birds, and one of the "airways" flown by ducks in their seasonal flights to and from the South. Deer, bison, elk and many fur-bearing animals once were numerous, and although the coming of man has reduced their numbers, sufficient remain to support a \$1,000,000 industry and to lure the most demanding hunter. To supplement the teeming animal and game life, the Division of Game and Fish operates the Buffalo Springs Game Farm, the Cheatham County Game Refuge and the Catoosa Game Refuge for the propagation of quail, partridge, turkey and deer.

Twenty-two State and National Parks offer irresistible diversion to lovers of the outdoors, especially mountain climbers. The Great Smoky Mountains National Park, the highest mountain mass east of the Rockies, with 16 peaks more than 6,000 feet in altitude, is beyond doubt the finest area of primeval wilderness in eastern America. It is excelled in size by few National Parks, and its 436,000 acres are surpassed by none in majestic beauty and grandeur.

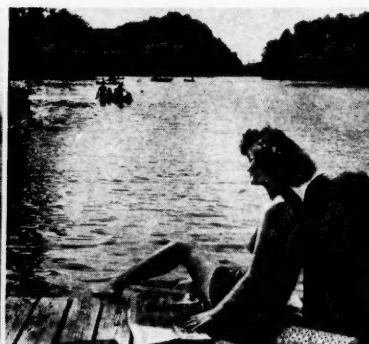
Shaded by great cedars, hemlocks and beeches, a hiker picnicker or equestrian may idle in pleasure along the far-flung trails hedged with the colorful flowers and shrubs of the region, at times emerging on a prominence overlooking lush valleys with colors softened by the pastel blue haze of the Smokies. Seven thousand miles of scenic highways give equal delight to the motorists.

The State contains 56 municipal and private courses from which golfers may choose.

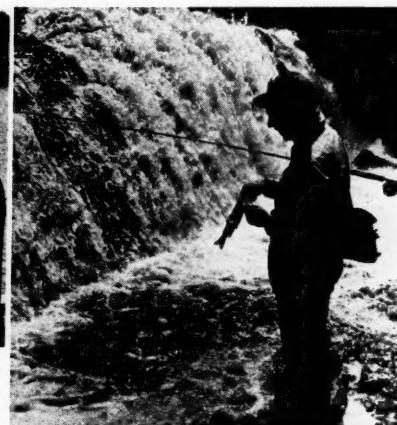
Tennessee's romantic historical background has left many mementos of its adventurous past, among which it is a delight for the student or visitor to wander. Here one catches glimpses going back to the days when coonskin-capped men pushed over the mountains some two hundred years ago to explore a virgin wilderness. It is the land of the Creeks and Cherokees, of Andrew Jackson, Sam Davis and Shiloh.

Tennessee, located within less than 36 hours' travel time of 51% of this nation's population, has justly been called the "Playground of Eastern America."

Chief physiographic features of Tennessee are, east to west: The Appalachian Mountains, the Tennessee Valley, the Cumberland Plateau, the east Highland Rim, the Nashville Basin, the west Highland Rim, the slope of west Tennessee and the Mississippi lowlands.



Hunting, swimming and fishing—Tennessee sports. The lake is at Norris Park.



South's Construction Totals \$834,532,000

SOUTHERN construction finished its third war year with a total of \$834,532,000.

Most of this total was made up of Federal and industrial construction, which altogether contributed \$792,725,000, or almost eighty-two per cent of the year's contract valuation.

Highway and bridge construction with its total of \$89,081,000, and the \$62,126,000 of private building made up the balance of the 1944 figure.

The \$834,532,000 total of 1944 is thirty-nine per cent of the average for the last five years. These include the two years of defense preparations and the three years of active warfare.

Average valuation placed on southern construction for the period from 1935 through 1939, the first five years of this decade, is \$824,941,000, or less than the \$834,532,000 total for 1944. The ten-year average is \$1,479,839,000.

A review of the months of 1944 show January's \$63,896,000 at about one-half the level of the comparable figure of the

by

Samuel A. Lauver

Managing Editor

preceding year, although private building and industrial contracts were higher.

Southern construction was steady during February of 1944. The \$63,844,000 total approximated the figure for the preceding month. Increased strength in highway and other engineering construction served to bolster the month's total in face of declines in private building and industrial construction.

March saw the highest total for the first quarter. The \$69,744,000 brought the accumulation of southern contracts to \$197,484,000. Doubled industrial construction and a slight rise in engineering contracts were responsible for the higher March figure. Industrial contracts totaled

\$28,559,000, the highest for any 1944 month.

April contracts totaling \$71,884,000 were a good start for the second quarter. The figure was the highest for the year up to that time and was the result of substantial increased activity in airfield construction coupled with rises in residential and public building and highway work.

The aggregate of southern contracts for the first four months of 1944 was \$269,368,000, or practically the same valuation as that of the comparable period of 1940 when the country began to swing into its defense program.

Industrial construction values in May more than doubled those for the preceding month, but decreases in public building and engineering projects pulled the May total down to \$63,688,000.

At the end of the first six months, the 1944 aggregate for southern construction was \$403,957,000, which was less than the figure for the comparable period of 1943. June contributed \$70,901,000 to the total and was eleven per cent ahead of its predecessor.

Public building and engineering, private building and highway award values rose in June. Although industrial awards dropped, there were expansions in the heavier industries such as shipbuilding, steel and oil, as well as railroads.

A second peak was reached in July, during which southern construction awards totaled \$83,064,000, and considerably overshadowed the previous high figure of April. Higher industrial and engineering contract totals were mainly responsible for the increase for the seventh month, which had the highest total for the third quarter.

The total for August was \$63,749,000. This was around the level of three other months—January, February and May. Seven states—Texas, Louisiana, Mississippi, Virginia, Georgia, Maryland and Florida—accounted for seventy per cent of the August figure. Private building fell to the lowest point of the year.

Southern construction rose in September to \$74,402,000, or sixteen per cent above the preceding month and within three per cent of the comparable month of 1943. Gains occurred in three of the five general classes of construction. Private building was up 139 per cent; industrial contracts, thirty-six per cent, and engineering construction, over twenty-eight per cent.

The first nine-month total for 1944 was \$625,172,000, as compared with the \$1,185,186,000 for the same period of the preceding year. Public building headed the 1944 nine-month list with a total of \$181,957,000; engineering construction with \$169,131,000 being next; the \$154,089,000 of industrial construction, third.

October made a good start for the last quarter by attaining the year's peak of

southern construction \$117,946,000 in 1944 that was the same month.

Southern construction \$386,000 in 1944, the year, proposed work during the contracts, totaled \$75,000.

December ending to \$48,000 recovery from last month, last place, was pushed.

Where construction is indicated, production B-1, construction \$600,000, a W.P.B. official 1943 total, 1943 total, *Turbo Record*.

Construction difficult to progress estimates that \$4,800,000, more than be scaled set-back e

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Alabama .
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District of Columbia .
Florida .
Georgia .
Kentucky .
Louisiana .
Maryland .
Mississippi .
Missouri .
North Carolina .
Oklahoma .
South Carolina .
Tennessee .
Texas .
Virginia .
West Virginia .

TOTAL

| | December, 1944 Contracts Awarded | Contracts to be Awarded | Contracts Awarded Twelve Months 1944 | Contracts Awarded Twelve Months 1943 |
|---|-------------------------------------|-------------------------|---|---|
| PRIVATE BUILDING | | | | |
| Assembly, (Churches, Theatres, Auditoriums, Fraternal) | \$591,000 | \$5,240,000 | \$6,217,000 | \$1,774,000 |
| Commercial (Stores, Restaurants, Filling Stations, Garages) | 805,000 | 1,024,000 | 6,361,000 | 2,023,000 |
| Residential (Apartments, Hotels, Dwellings) | 1,638,000 | 3,555,000 | 48,882,000 | 85,277,000 |
| Office | 100,000 | 575,000 | 666,000 | 268,000 |
| | \$3,154,000 | \$10,394,000 | \$62,126,000 | \$89,342,000 |
| INDUSTRIAL | \$15,461,000 | \$9,284,000 | \$192,301,000 | \$33,506,000 |
| PUBLIC BUILDING | | | | |
| City, County, State, Federal and Hospitals | 9,155,000 | 29,016,000 | \$214,738,000 | \$414,702,000 |
| Housing | 813,000 | 6,635,000 | 47,972,000 | 209,012,000 |
| Schools | 1,386,000 | 36,523,000 | 20,151,000 | 15,784,000 |
| | \$11,354,000 | \$72,174,000 | \$282,861,000 | \$639,498,000 |
| ENGINEERING | | | | |
| Dams, Drainage, Earthwork, Airports | \$8,769,000 | \$17,220,000 | \$174,274,000 | \$265,478,000 |
| Federal, County, Municipal Electric Sewers and Waterworks | 610,000 | 1,016,000 | 2,123,000 | 5,813,000 |
| | 1,426,000 | 6,585,000 | 31,166,000 | 37,515,000 |
| | \$10,805,000 | \$24,821,000 | \$215,198,000 | \$306,306,000 |
| ROADS, STREETS AND BRIDGES... | \$7,274,000 | \$7,350,000 | \$89,681,000 | \$128,494,000 |
| TOTAL | \$48,048,000 | \$124,023,000 | \$834,532,000 | \$1,504,148,000 |

South's Construction by States

| | December, 1944 Contracts Awarded | Contracts to be Awarded | Contracts Awarded Twelve Months 1944 | Contracts Awarded Twelve Months 1943 |
|----------------------------|-------------------------------------|-------------------------|---|---|
| Alabama | \$1,500,000 | \$2,781,000 | \$35,778,000 | \$51,973,000 |
| Arkansas | 198,000 | 1,713,000 | 67,964,000 | 39,674,000 |
| District of Columbia | 468,000 | 4,522,000 | 19,809,000 | 17,157,000 |
| Florida | 3,691,000 | 10,116,000 | 82,439,000 | 187,891,000 |
| Georgia | 2,143,000 | 5,723,000 | 44,231,000 | 98,771,000 |
| Kentucky | 1,840,000 | 1,550,000 | 22,883,000 | 45,663,000 |
| Louisiana | 2,844,000 | 7,499,000 | 60,203,000 | 85,187,000 |
| Maryland | 1,544,000 | 5,843,000 | 59,285,000 | 105,871,000 |
| Mississippi | 197,000 | 2,159,000 | 20,110,000 | 41,131,000 |
| Missouri | 1,066,000 | 4,611,000 | 45,056,000 | 21,481,000 |
| North Carolina | 2,968,000 | 8,382,000 | 33,203,000 | 57,069,000 |
| Oklahoma | 2,432,000 | 12,740,000 | 23,122,000 | 106,892,000 |
| South Carolina | 2,022,000 | 3,546,000 | 22,023,000 | 49,793,000 |
| Tennessee | 377,000 | 18,008,000 | 24,875,000 | 101,994,000 |
| Texas | 21,478,000 | 33,683,000 | 172,506,000 | 386,718,000 |
| Virginia | 2,871,000 | 6,517,000 | 82,070,000 | 89,320,000 |
| West Virginia | 780,000 | 50,000 | 19,960,000 | 16,332,000 |
| Total | \$148,048,000 | \$124,023,000 | \$834,532,000 | \$1,504,148,000 |

southern construction with a total of \$117,946,000. This was the only month of 1944 that reached a higher total than the same month of the preceding year.

Southern construction stood at \$43,386,000 in November, the lowest point of the year, although, a large amount of proposed work was revealed by reports during the month. Southern construction contracts, including the eleventh month, totaled \$786,484,000.

December contracts, altogether amounting to \$48,048,000, showed a slight recovery from the November low, but the last month of 1944 finished second from last place, as the total for the entire year was pushed up to \$834,532,000.

Where the \$834,532,000 for southern construction stood in the national picture is indicated by estimates of the War Production Board that the country's construction in 1944 amounted to \$3,840,000,000, a volume, which according to W.P.B. officials is not quite one-half of the 1943 total of \$7,732,000,000. The South's 1943 total, as tabulated by the *Manufacturers Record*, was \$1,504,148,000.

Construction prospects for 1945 are difficult to gauge, and change with the progress of allied forces in Europe. Estimates that the country's volume will be \$4,800,000,000, or twenty-six per cent more than the 1944 total, however, may be scaled downward due to the recent set-back experienced in Belgium.

If the war is prolonged private building probably will show relatively little increase.

Predictions were made early in December by the market analysis committee of the Producers' Council which assumed that the much disputed restrictive order L-41 of the War Production Board would be revoked or relaxed upon termination of active warfare in Europe. Although in an entirely different field, Office of Price Administration action restoring many foods to the ration list late in December, may be a harbinger of what is in store for the building industry.

Probable volume of private construction, as forecast before the Belgium reverses, was \$2,800,000,000; of public con-

(Continued on page 178)

Public Building (South)

(City, County, State, Federal, Schools)

| | Contracts December, 1944 | Awards Contracts to be Awarded 1944 | Contracts December, 1944 | Awards Contracts to be Awarded 1944 |
|------------------------|-----------------------------|---|-----------------------------|---|
| Alabama | \$1,311,000 | \$1,305,000 | \$11,490,000 | |
| Arkansas | 143,000 | 777,000 | 63,682,000 | |
| Dist. of Col. | 131,000 | 92,000 | 12,355,000 | |
| Florida | 502,000 | 1,831,000 | 19,330,000 | |
| Georgia | 804,000 | 4,578,000 | 13,044,000 | |
| Kentucky | 10,000 | 12,200,000 | 1,130,000 | |
| Louisiana | 514,000 | 1,699,000 | 18,449,000 | |
| Maryland | 980,000 | 3,468,000 | 32,380,000 | |
| Mississippi | 130,000 | 997,000 | 8,447,000 | |
| Missouri | 271,000 | 3,296,000 | 4,542,000 | |
| N. Carolina | 539,000 | 1,202,000 | 12,989,000 | |
| Oklahoma | 307,000 | 10,435,000 | 3,796,000 | |
| S. Carolina | 226,000 | 2,885,000 | 6,697,000 | |
| Tennessee | 166,000 | 11,920,000 | 3,803,000 | |
| Texas | 2,923,000 | 20,996,000 | 35,507,000 | |
| Virginia | 2,334,000 | 4,343,000 | 31,454,000 | |
| W. Virginia | 57,000 | ..... | 3,307,000 | |
| TOTAL | \$11,354,000 | \$72,174,000 | \$282,861,000 | |

Private Building (South)

(Assembly, Commercial, Residential, Office)

| | Contracts December, 1944 | Awards Contracts to be Awarded 1944 | Contracts December, 1944 | Awards Contracts to be Awarded 1944 |
|------------------------|-----------------------------|---|-----------------------------|---|
| Alabama | \$160,000 | ..... | \$1,250,000 | |
| Arkansas | 110,000 | ..... | 54,000 | |
| Dist. of Col. | 3,000,000 | ..... | 20,000 | |
| Florida | 319,000 | ..... | 7,104,000 | |
| Georgia | 210,000 | ..... | 205,000 | 3,189,000 |
| Kentucky | 100,000 | ..... | 100,000 | |
| Louisiana | 30,000 | ..... | 300,000 | 4,133,000 |
| Maryland | 85,000 | ..... | 2,050,000 | 3,127,000 |
| Mississippi | 60,000 | ..... | 902,000 | |
| Missouri | 42,000 | ..... | 430,000 | 3,815,000 |
| N. Carolina | 20,000 | ..... | 320,000 | 1,280,000 |
| Oklahoma . . . . . | ..... | ..... | 125,000 | 795,000 |
| S. Carolina | 20,000 | ..... | 211,000 | 473,000 |
| Tennessee . . . . . | ..... | ..... | 270,000 | 5,700,000 |
| Texas | 2,200,000 | ..... | 2,654,000 | 28,204,000 |
| Virginia | 80,000 | ..... | 30,000 | 3,575,000 |
| W. Virginia . . . . . | ..... | ..... | 50,000 | |
| Total | \$8,154,000 | \$10,394,000 | \$62,126,000 | |

Public Engineering (South)

(Dams, Drainage, Sewers, Waterworks, etc.)

| | Contracts December, 1944 | Awards Contracts to be Awarded 1944 | Contracts December, 1944 | Awards Contracts to be Awarded 1944 |
|------------------------|-----------------------------|---|-----------------------------|---|
| Alabama | \$ 27,000 | \$ 410,000 | \$7,921,000 | |
| Arkansas | 476,000 | 2,530,000 | | |
| Dist. of Col. | 71,000 | 200,000 | 5,239,000 | |
| Florida | 2,022,000 | 6,451,000 | 43,524,000 | |
| Georgia | 519,000 | 415,000 | 8,809,000 | |
| Kentucky . . . . . | ..... | 512,000 | | |
| Louisiana | 1,240,000 | 2,330,000 | 19,400,000 | |
| Maryland | 317,000 | 140,000 | 12,030,000 | |
| Mississippi | 15,000 | 20,000 | 5,580,000 | |
| Missouri | 11,000 | 305,000 | 6,605,000 | |
| N. Carolina | 2,224,000 | 775,000 | 11,735,000 | |
| Oklahoma | 827,000 | 20,000 | 6,048,000 | |
| S. Carolina | 607,000 | 270,000 | 7,789,000 | |
| Tennessee | 61,000 | 5,425,000 | 6,455,000 | |
| Texas | 2,004,000 | 5,975,000 | 40,418,000 | |
| Virginia | 337,000 | 1,600,000 | 20,968,000 | |
| W. Virginia | 723,000 | ..... | 4,706,000 | |
| TOTAL | \$10,505,000 | \$24,281,000 | \$207,563,000 | |
| | | | TOTAL | \$8,274,000 |
| | | | | \$7,350,000 |
| | | | | \$89,681,000 |

Roads, Streets, Bridges (South)

| | Contracts December, 1944 | Awards Contracts to be Awarded 1944 | Contracts December, 1944 | Awards Contracts to be Awarded 1944 |
|------------------------|-----------------------------|---|-----------------------------|---|
| Alabama | \$ 300,000 | ..... | \$ 6,950,000 | |
| Arkansas | 150,000 | ..... | 573,000 | |
| Dist. of Col. | 206,000 | ..... | 1,363,000 | |
| Florida | 300,000 | 1,100,000 | 8,247,000 | |
| Georgia | 215,000 | ..... | 350,000 | 7,947,000 |
| Kentucky | 35,000 | ..... | 150,000 | 4,966,000 |
| Louisiana | 787,000 | ..... | 1,100,000 | 7,379,000 |
| Maryland . . . . . | ..... | ..... | 85,000 | 4,852,000 |
| Mississippi . . . . . | ..... | ..... | 100,000 | 1,197,000 |
| Missouri | 348,000 | ..... | 330,000 | 3,534,000 |
| N. Carolina | 11,000 | ..... | 50,000 | 3,512,000 |
| Oklahoma | 1,498,000 | ..... | 2,160,000 | 4,823,000 |
| S. Carolina | 980,000 | ..... | 60,000 | 2,394,000 |
| Tennessee . . . . . | ..... | ..... | 100,000 | 3,109,000 |
| Texas | 2,834,000 | ..... | 1,163,000 | 18,957,000 |
| Virginia . . . . . | ..... | ..... | 50,000 | 5,869,000 |
| W. Virginia . . . . . | ..... | ..... | 50,000 | 4,069,000 |
| TOTAL | \$8,274,000 | \$7,350,000 | \$89,681,000 | |

Estimated New Construction (United States)

(Millions of Dollars)

| | 1943 | 1944 | Assumes Defeat of Germany in the War Through the year on Two Fronts continuing |
|-------------------------------------|----------------|----------------|--|
| TOTAL CONSTRUCTION | \$7,732 | \$3,840 | \$3,150 |
| Total Public | 6,144 | 2,354 | 1,680 |
| Total Private | 1,598 | 1,486 | 2,090 |
| MILITARY | 2,423 | 730 | 450 |
| Housing | 746 | 222 | 125 |
| Aeronautics | 1,069 | 298 | 180 |
| Other Military | 378 | 210 | 145 |
| INDUSTRIAL | 2,198 | 920 | 595 |
| Publicly Financed | 1,973 | 735 | 400 |
| Privately Financed | 225 | 185 | 195 |
| HOUSING | 1,318 | 685 | 525 |
| Publicly Financed | 702 | 188 | 75 |
| Privately Financed | 616 | 497 | 450 |
| ALL OTHER | 1,793 | 1,505 | 2,000 |
| Public | 1,046 | 701 | 725 |
| Community Buildings | 124 | 120 | 160 |
| Highways | 410 | 318 | 325 |
| Sewer and Water | 95 | 79 | 100 |
| Conservation | 244 | 142 | 150 |
| Other Non-residential | 173 | 42 | 45 |
| Private | 747 | 804 | 825 |
| Community Buildings | 98 | 133 | 145 |
| Farm | 160 | 170 | 245 |
| Utilities | 491 | 501 | 485 |

¹ Schools, hospitals, recreational, commercial, and religious structures.

² Railroads, gas, pipe lines, electric light and power, telephone and telegraph.

Something NEW

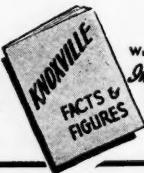


Now

KNOXVILLE OFFERS
YOU LOCAL
SKILLED LABOR

BRING your post-war plant to Knoxville, Tennessee, home of skilled craftsmen—native-born, intelligent workers who get along with management! For in today's NEW SOUTH, Knoxville too has acquired new skills. Since Pearl Harbor, thousands of workers have been precision-trained in the widely varied industries located in this area . . . in iron and aluminum plants . . . in plastic and chemical industries . . . in textiles . . . and in plants making thermostatic controls, mine cars, drilling equipment, bearings, road-building machinery, bomb sights and confidential war materiel—an almost endless array of products requiring skilled labor. Why not use this pool of willing workers? Our progressive city government will welcome you and cooperate with you.

Let Us Analyze
Your Needs



Write To...
Industrial Development
Committee

ATTENTION: H. BRADFORD JONES
INDUSTRIAL ENGINEER
626 SOUTH GAY STREET
KNOXVILLE II, TENNESSEE

CITY OF KNOXVILLE

Has Been Added!

Plus

**176 MEN
AT YOUR SERVICE!**



ONE OF THE MOST OUTSTANDING! GROUPS OF JAYCEES IN THE NATION! *

FOR specific information as to how Knoxville can meet your post-war plant needs, take advantage of a new TAILOR-MADE SERVICE offered you by the Knoxville Junior Chamber of Commerce. Working in connection with greater Knoxville's community leaders, these 176 men—trained and experienced in many fields—will conduct individual surveys for you . . . find out the particular facts needed to help you determine how profitably you can operate here. Write us your plant requirements; we'll do the "leg work." *Knoxville invites you.*

*For progressiveness, ingenuity and civic accomplishment, the Knoxville Junior Chamber of Commerce was voted among the top four of the J. C. of C. groups in the nation.

KNOXVILLE offers you--

- ✓ NATIVE-BORN skilled labor
- ✓ CHEAP power and abundant water supply
- ✓ RICH resources
- ✓ VARIETY of basic products
- ✓ BETTER living
- ✓ AMPLE transportation facilities
- ✓ GATEWAY to mass markets
- ✓ DIVERSIFIED agricultural products
- ✓ EXCELLENT plant sites

JUNIOR CHAMBER OF COMMERCE

Knoxville, Tennessee

LABOR *lends* *a helping hand* **in KNOXVILLE, TENN.**

Bring your post-war plant to Knoxville, home of skills and crafts, where you'll find a plentiful supply of loyal, intelligent labor . . . *labor that lends a helping hand to management*. In Knoxville, labor *believes in cooperation*. Representatives from its various crafts are serving and working with all types of government and civic organizations for the good of the community and the nation—OPA Advisory Committee, War Manpower Commission, ration boards, civic clubs, government bodies, vocational education committee, industrial development committee and various other groups.

Labor invites you to bring your new plant to Knoxville. Write to Knoxville's industrial development committee for a comprehensive and confidentially prepared analysis of your needs. Address: *H. Bradford Jones, Industrial Engineer—626 South Gay Street, Knoxville, Tennessee*.



KNOXVILLE BUILDING & CONSTRUCTION TRADES COUNCIL

KNOXVILLE, TENNESSEE



Knoxville & Knox County
Gateway to Mass Markets



BRING your post-war plant to Knoxville—one of the fastest growing transportation hubs in the South. In Knox County, your plant will be centrally located with respect to the nation's mass markets—close to 69% of the nation's population. Excellent transportation facilities are available for your use—rail, highway and air for rapid movement of your products—year-round water transportation for slower moving bulk products or raw materials. With the completion of TVA's great system of locks and dams, linking Knoxville with the Mississippi River, this inland waterway offers a great future.

Coupled with its abundant 4-way transportation facilities, Knox County offers you exceptional opportunities for establishing new industries here.

One of several promising industries in this area is that of food processing plants. Here you will find a variety of farm products—livestock, dairy products, tobacco, vegetables, fruits and grains. Why not take advantage of these opportunities? *Knox County invites you.*

Let Us Analyze
Your Needs

KNOXVILLE
FACTS &
FIGURES

Write To...
Industrial Development
Committee

ATTENTION: H. BRADFORD JONES
INDUSTRIAL ENGINEER
626 SOUTH GAY STREET
KNOXVILLE II, TENNESSEE

KNOXVILLE offers you--

- ✓ NATIVE-BORN skilled labor
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- ✓ BETTER living
- ✓ AMPLE transportation facilities
- ✓ GATEWAY to mass markets
- ✓ DIVERSIFIED agricultural products
- ✓ EXCELLENT plant sites

KNOX COUNTY, TENNESSEE

KNOXVILLE OFFERS
OPPORTUNITY PLUS
Better Living!



BRING your post-war plant to Knoxville—*heart of Eastern America's vacation-land* with its beautiful streams and parks—surrounded by the “Great Lakes of the South”—at the foot of the Great Smoky Mountains. Knoxville indeed offers you better living in this mild, southern climate that makes outdoor recreation enjoyable at all seasons of the year.

Because of the progressively increasing appeal of this area to tourist, vacationist and resident alike, Knoxville offers great opportunities for the manufacture of sports equipment, outdoor clothing, boats, fishing and hunting accessories, and exceptional opportunities for investment in tourist and other recreational facilities such as camps, hotels, etc. Here too, you will find tremendous resources, cheap industrial power and *native-born* skilled labor—craftsmen and technicians who are here to stay, permanently, because of Knoxville's *better living*. Why not locate your new plant in these pleasant surroundings? *Knoxville invites you.*



Write To...
Industrial Development
Committee

ATTENTION: H. BRADFORD JONES
INDUSTRIAL ENGINEER
626 SOUTH GAY STREET
KNOXVILLE 11, TENNESSEE

KNOXVILLE offers you--

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- ✓ BETTER living
- ✓ AMPLE transportation facilities
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- ✓ EXCELLENT plant sites

KNOXVILLE Tourist Bureau

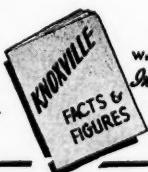
Knoxville, Tennessee



KNOXVILLE invites industry to use its rich resources. Here you will find the industrial site to fit your needs—on river, on rail, on highway—with a tremendous source of raw materials right at hand. In this immediate area you will find rich farmlands, timber and plentiful deposits of coal, iron ore, feldspar, mica, kyanite, talc, soapstone, manganese, corundum, emery, dolomite, bauxite, zinc, copper, tin, lead, barite, shale, silica, kaolin, limestone, marble, sand, and various building clays and stones—over 40 different minerals available for your use.

Since 1916, the Knoxville Sangravil Material Company has taken part in the industrial development of this great area—has furnished sand, gravel, cement and numerous other materials for building and for processing. Why not use these low-cost building materials and rich resources? *Knoxville invites you.*

Let Us Analyze
Your Needs



Write To...
Industrial Development
Committee

ATTENTION: H. BRADFORD JONES
INDUSTRIAL ENGINEER
626 SOUTH GAY STREET
KNOXVILLE II, TENNESSEE

KNOXVILLE offers you--

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- ✓ DIVERSIFIED agricultural products
- ✓ EXCELLENT plant sites

Knoxville Sangravil Material Company

Knoxville, Tennessee



Rayon Tire Cord Plant Produces at Rate of 12,000,000 Pounds Yearly

RAYON tire cord production at the new \$2,240,000 Scottsville, Va., plant being operated for the Federal Government by United States Rubber Co. will be 12,000,000 pounds annually when full capacity is reached. The 180 workers now employed will reach 300 within the next few months.

Construction of plant was started last May and completed according to schedule. The project was financed by the Defense Plant Corporation and is being operated under lease by United States Rubber Com-

pany, with O. L. Ward in charge as superintendent.

A comprehensive training program has been underway and inspec-

Top of page—Rayon tire cords speeds through looms at \$2,240,000 plant being operated for the Federal government at Scottsville, Va., where the annual capacity is 12,000,000 pounds annually.

Right—Supt. O. L. Ward inspects roll of finished rayon tire cord.



far as possible the company has hired and trained local labor without previous textile experience.

The building is modern in design and construction with no windows except for the office. Temperature and humidity control are maintained by a change of air every four to six minutes. The floor is specially built for resilience, moisture resistance and vibration absorption. Fluorescent lighting is used throughout. In the building proper are located supply rooms, machine shop, rest rooms, kitchen and a cafeteria with seating capacity of 100.

Machinery is set up for straight line production. Rayon filament yarn of 1,100 denier is put into a twisting machine at one end of the room. It is first-ply twisted, then respooled, cable-twisted and woven, and it comes out the other end as high-tenacity tire cord fabric.

Rayon which is received and stored at the plant on beams weighing 1,000 pounds each is handled by an electric conveyor system incorporating the most advanced automatic features. At the press of a button an overhead crane picks up a half-ton beam, carries it automatically to a predetermined point on the production line and lowers it into place on the selected twister.

Mechanization not only speeds production but also helps solve the manpower problem by reducing the number of men required for handling. About 90 percent of the employees in the manufacturing operations are women, and 70 percent of the entire plant personnel, including machine shop, warehouses and offices, are female.

Opening of the Scottsville mill increases to seven the number of textile plants operated by the textile division of United States Rubber Company. More than 5,000 people are employed and 168,260 spindles are operated in the production of cotton, rayon, Asbeston, nylon and other yarns used in the manufacture of rubber products for the armed forces and for essential civilian needs.

The company first ventured into the textile business in 1917 by acquiring a controlling interest in the Winnsboro Mills, Winnsboro, S. C.,

for the producing which v America years, the equipment operating quadrup bought t years later agement 49,152 sp ators a rayon a year.

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JANUA

for the purpose of developing and producing an improved tire cord which would reduce blowouts on American automobiles. In three years, through installation of new equipment and through increased operating efficiency, production was quadrupled. In 1926 the company bought the concern outright and two years later assumed complete management. Today this plant houses 49,152 spindles, employs 1,570 operators and manufactures cotton, rayon and nylon cord, and Ustex yarn.

Winnisboro for ten years supplied all the tire cord needed by the company, but in 1931, with the purchase of additional tire factories, more cord was needed, so in that year the company purchased the Stark Mills, Hogansville, Ga. Today this plant operates 36,420 spindles and employs 1,131 operators in the production of tire cord, many types of mechanical yarn and critically needed plied duck yarns. The mechanical yarn unit installed in the Stark mills in 1937 was the first step taken by the company to produce any material other than tire cord.

As the demand for tire cord and other textile products increased, the company continued to expand its spinning and weaving facilities. Additional mills were acquired in the following order:

1934—Shelbyville Mills, Shelbyville, Tenn., a drill and sheeting mill, converted into a cord mill. Payroll 863; spindles 24,804.

1940—Fisk Cord Mills, New Bedford, Mass. Payroll 1,200; spindles 42,588.

1942—Reid Mills, Hogansville, Ga., producing ducks needed by the armed forces and hose and belt duck for the company's mechanical goods division. Employees 429; spindles 12,096; looms 124.

1942—Built a new plant at Hogansville for the production of Asbeston, a lightweight fireproof fabric for fire-fighting suits, cable insulation and other products. Employees 223; spindles 1,700; looms 19.

1944—Opened new rayon mill at Scottsville, Va.

Scottsville is the company's first mill devoted exclusively to the processing of rayon. Rayon has been

found superior to cotton in the manufacture of heavy-duty bus, truck and airplane tires but officials believe cotton will continue to be one of the leading fibers used in the fabrication of rubber goods. It is still used in the manufacture of light-duty tires and it is a basic material in footwear, clothing, sea rescue equipment, hose, conveyor belts and scores of other products now being produced in great quantities.

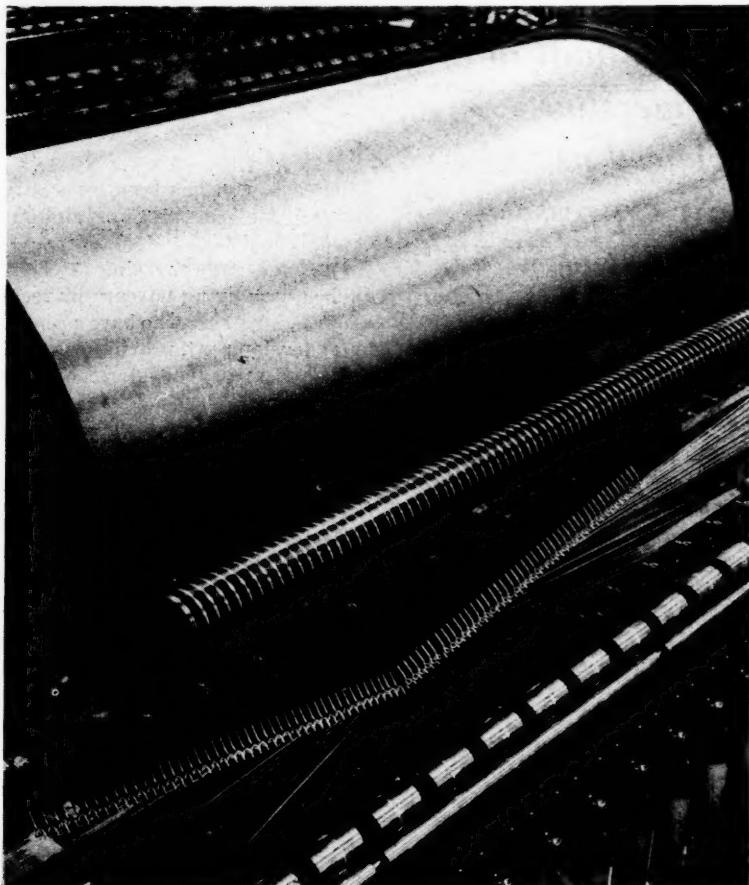
H. Gordon Smith, general manager of the company's textile division, says cotton has certain excellent qualities, pointing out that it is versatile, economical and plentiful, and may be made waterproof, flame-proof and weatherproof.

One of the company's outstanding war-time developments is Ustex, a cotton yarn treated by a chemical and mechanical process to give up to 70 percent more tensile strength than ordinary cotton yarn. It is being used in large quantities in the manufacture of parachute harness for the armed forces.



Above — Ply-twisted and re-spooled rayon yarn going through the cable twisting process during which two plies are further twisted to make the finished high-tensile cord for tires.

Below—Rayon is received at the plant on 1,000-pound beams and ply-twisted on bobbins spinning at the rate of 4,000 revolutions per minute.





ARMY CARGO PLANE CARRIES TANKS, AMMUNITION, TROOPS

"flying box car"
being built at
Hagerstown
viewed as
air express
in post-war
aviation

MILITARY secrecy surrounding the development and production of the C-82 "Packet," the Army Air Forces' latest cargo plane, has been lifted and many of the details and characteristics revealed by an announcement from the Fairchild aircraft plant at Hagerstown, Md., where the big ships are being manufactured.

Designed for carrying tanks, ammunition, supplies, troops or paratroops to distant points of combat and operations, the "Packet" has a range in excess of 3,500 miles and is in the 50,000 pound class of aircraft.

It is powered by two Pratt & Whitney 18-cylinder R-2,800-22 engines, with a take-off horsepower of

Above—The C-82 "Packet" cargo plane being produced at the Hagerstown, Md., plant of Fairchild Aircraft. Powered by two 18-cylinder Pratt & Whitney engines of 2100 take-off horsepower, the "flying boxcar," as it is called, has a range of 3500 miles and is in the 50,000-pound class of aircraft. It can carry tanks, ammunition, supplies and troops and is expected to take its place on domestic and foreign airlines in peacetime.

2,100 each, and has been especially designed for operation into and out of small fields.

The huge cargo-carrying fuselage, dubbed "the flying boxcar" by technicians and others who have assisted in its development, provides vertical walls and unobstructed cargo space for its entire length. Adjustable ramps permit large assembled vehicles to be driven directly into its spacious interior.

The floor of the compartment is parallel to the ground and loading is accomplished directly through hinged doors in the after section of the fuselage. In flight these same doors close to form the rear of the fuselage.

The fuselage platform is the same height as that of a standard truck floor, a feature which makes possible rapid loading operations under all conditions.

Aside from being able to haul tons of cargo, vehicles, engines and assembled war equipment thousands

of miles non-stop, the Fairchild "Packet" is also equipped for troops or paratroop transportation and for glider towing.

Although its immediate application is for tactical purposes, Fairchild engineers see in this new craft many varied post-war uses in both domestic and foreign air express and passenger operation. They estimate that the "Packet" can carry as many as 76 passengers by day and 30 by night in upper and lower berths on both sides of the aisle.

As a luxury passenger airliner, the "Packet" is expected to have provisions for 50 passengers in spacious reclining chairs, a lounge, washrooms and observation space. Conversion from passenger transport to aerial freighter may be accomplished in less than an hour by removing and storing all passenger seats.

While accurate per-ton mile operation costs are not yet available, it is believed the "Packet" will be an excellent aircraft with which do-

mestic and freighted. Be carrying tary desi which no can hand dicate the type of cargo op tives will be reviewed.

The fu ally sus cantileve The cent engine na ward po booms. treme to at the p few feet flight de fuselage, downward outer par

Both t panels a using rib panels a bottom neath the ter section lower side



mestic and international air express and freight routes might be operated. Because of its unique cargo-carrying features, the present military design can haul certain loads which no other present-day aircraft can handle. Since recent surveys indicate that there is a need for this type of aircraft for commercial cargo operation, airline representatives will soon have an opportunity to review details of the "Packet."

The fuselage of the C-82 is literally suspended beneath its great cantilever wing of 106-foot span. The center wing section includes the engine nacelles, which form the forward portions of the twin tail booms. It passes through the extreme top portion of the fuselage at the point of maximum depth a few feet behind the very spacious flight deck. From each side of the fuselage, the center section slopes downward to the points where the outer panels are attached to it.

Both the center section and outer panels are of two-spar construction using ribs of alclad sheet. The outer panels are reinforced both top and bottom by a corrugation skin beneath the flat alclad covering skin, while the corrugation under the center section skin is used only on the lower side.

Two aluminum ailerons, fabric covered, are used on each outer panel. The twin tail booms supporting the empennage are of metal monocoque construction. The horizontal stabilizer is of conventional alclad frame and covering as are the vertical fins. Rudders and elevator are of alclad frames with fabric covering. Two tabs are used in the elevator and one in each rudder. Two slotted wing flaps are used on both sides of the wing from the ailerons inboard to the fuselage, one inboard and one outboard of the engine nacelles.

The fuselage is of monocoque metal construction with alclad sheet and formed longitudinal stringers mounted on fabricated alclad frames. Seven longitudinal beams take the floor and tie-down loads in the main cargo area beneath the plywood-covered floor. Tie-down fittings are located in the center of 20-inch squares throughout the entire floor area.

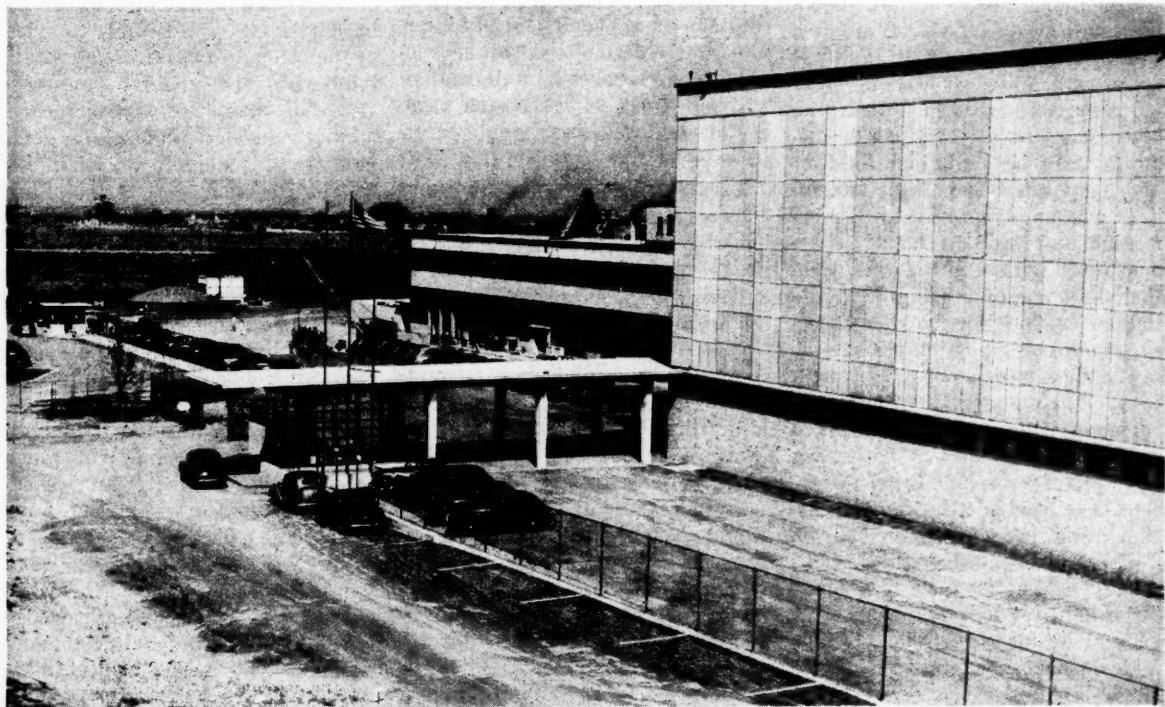
Landing gear is of the tricycle type with single wheels at all three points. The main wheels retract into the underside of the engine nacelles, and the nose wheel is concealed within the nose section forward of

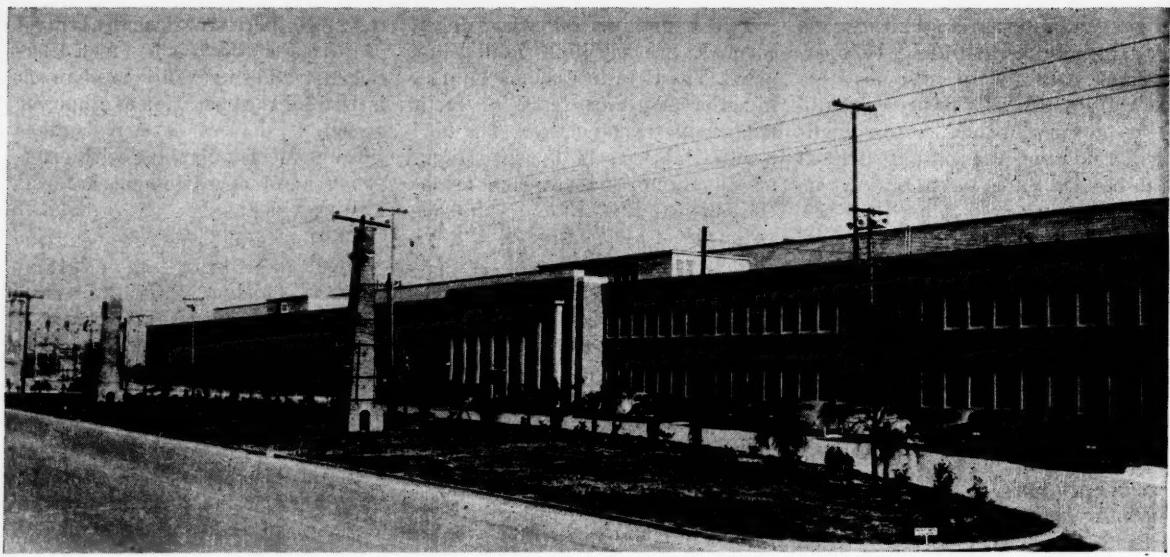
the cargo space. Total vertical travel of the main wheels is 9½ feet. Electric instead of hydraulic mechanism is used for the operation of all power actuated devices except brakes throughout the airplane with emergency hand operation mechanisms also provided.

The original design of the "Packet" was begun late in 1941 by Armand Thieblot, Fairchild's chief engineer, in answer to the need of the AAF for a fast, long-range military cargo plane which could also be adapted to other tactical purposes. A mock-up was completed early in 1942. Before the end of that year the Army Air Forces Mock-Up Board had, with a few minor modifications, approved the design, and detailed engineering work was inaugurated. Actual engineering and design, including the construction and preliminary flight testing of the prototype, took less than 21 months—a near record for an aircraft of this type and size.

Fairchild has received a contract for an undisclosed quantity of C-82 airplanes. Production has already begun in a new factory at Hagerstown, recently constructed for the purpose.

Below—Fairchild has recently completed a new factory at Hagerstown, Md., to produce the giant C-82 "Packet" cargo carriers for the Army Air Forces.





Multiple Industrial Tenancy

In the previous article of this series there were covered the broader economic and physical aspects of Multiple Industrial Tenancy. In this, the concluding article, an effort will be made to bring out detailed advantages to communities, business men, banks, physicians and others in Cities where the MIT plan is put into operation.

A large size property tenanted by a large number of diversified industries will be an immensely greater asset to a community than the same property tenanted by a single large industry. A single large industry located in a relatively small community can be a distinct liability and may offer a definite hazard. This was amply proven by the immediate and rapid decline of numerous New England mill towns when their shoe manufacturing or textile industries closed or moved away.

It would be impossible to conceive of the mass movement away from a town of 75 or 100 different manufacturing and industrial operations in a relatively short period of time for any reason, or combination of reasons. The worst depressions the nation has experienced left some industries prospering, and many surviving, in every community. A single large industry may be ruined by a general business recession, technological changes or the death of a single key individual.

by
McL. Smith

As between 100 small businesses employing 25 people each and a single large operation employing 2,500 people, the distribution of income and property among the employes and operators of the 100 small industries will be such as to result in more people actively interested in the development of the community and its over-all welfare than will be found among the same number of employees in a single enterprise.

The addition to the community of 100 moderate-sized commercial banking accounts and 100 separate groups of employee accounts will result in a healthier growth in the local banking and financial structure than the addition of a single large commercial account and a single large group of employees. A single large industry will maintain its own accounting department; several public accountants can maintain offices on the business that would be supplied by 100 small firms. The large company will maintain its own fleet of trucks and truck servicing department; the 100 smaller companies will employ the services of a number of public truckers. Some will have one or two or

three trucks of their own, but none will have enough to maintain its own truck service department, making an additional market for garages, local filling stations and repair shops.

Printing establishments, photographers, duplicating services, commercial insurance underwriters, machine and repair shops, freight forwarding companies, and a long list of other manufacturing and servicing businesses will be able to exist in the community with many small industries, but would be unnecessary and unable to exist in a community dependent on one large company that is able to maintain its own independent services, including full-time physician and in some instances, its own hospital. Each of these services, repair shops, sales offices, etc., is a spot for one or more returning service men to invest his small capital and to employ his energies to the immediate and future advantage of the community.

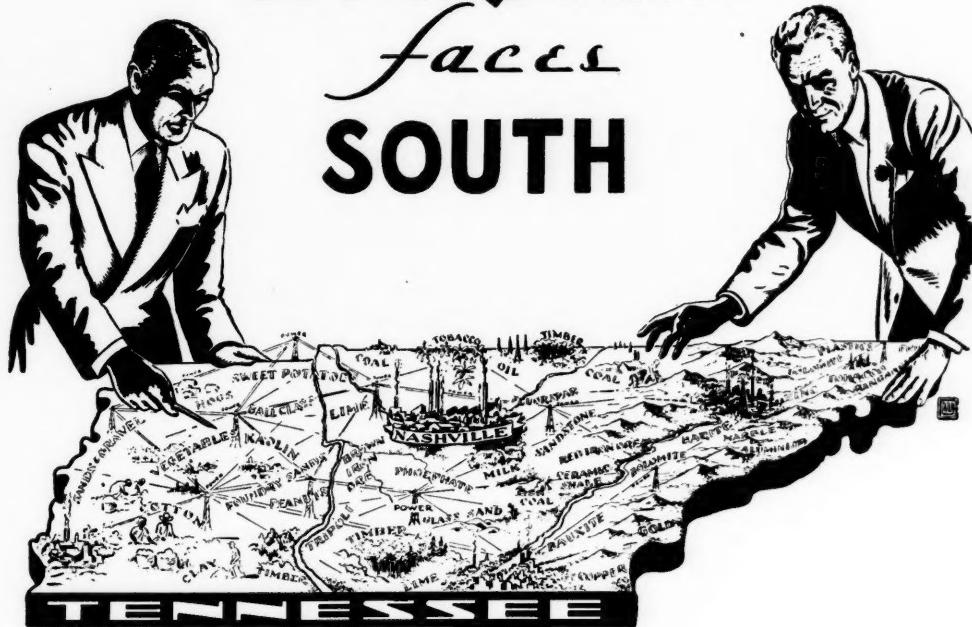
The Federal government and individual communities are giving much attention to returning servicemen who want to start in business for themselves. The average soldier or sailor without means other than public assistance provided for in current legislation, will apparently have at his personal command around \$3,000. A MIT project in his

(Continued on page 170)

OPPORTUNITY

faces

SOUTH



Industry, facing decentralization, will find compelling interest in the South's abundance of raw materials, favorable climate, agriculture, cheap power, excellent rail, water, air and highway transportation, native born labor trained through war production and proximity to South

American markets.

On behalf of hundreds of important correspondent banks, the American National, a key bank in the Central South for more than sixty years, will welcome these new industries—assuring full cooperation. Inquiries invited.

Since 1883

THE AMERICAN NATIONAL BANK
NASHVILLE
CAPITAL FUNDS OVER EIGHT MILLION DOLLARS

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Textile Transition Shock Deemed Slight

THE shock of transition of the textile industry from war to peace will not be too severe, according to Dr. C. T. Murchison, president of the Cotton Textile Institute, who sees his as one of the most fortunate of all the major manufacturing industries with the outlook for continued production at high levels exceedingly bright.

"After the termination of all hostilities," he says, "there is bound to be for the period of rehabilitation a heavy foreign demand for American cotton goods. Large areas of the world are destitute of cotton fabrics and their purchases of American goods will be limited only by the availability of purchasing power. It is apparent that the United Nations, and particularly the United States, will make every effort to overcome these financial limitations, either through lend-lease or UNRRA or by the provision of direct loans or guaranteed credits."

Dr. Murchison views a permanent policy of lending and giving as "Disastrous alike to us and to the war-torn countries," warning that "we must anticipate an eventual return to peacetime competitive conditions and this return may be nearer than we think." He expects a reconversion program composed of a number of elements, the most immediate of which is the problem of contract termination followed by establishment of new production schedules geared to the needs of the peacetime market.

The peacetime market seen by Dr. Murchison will be different from that of the period before Pearl Harbor. There will be changes in consumer demand, both in industry and in individual use. New fabric finishes have been developed; new applications have made their appearance. New end uses are in the making. These, coupled with many commodity substitutes that must be allowed for, will find the abundance-scarcity positions of the various types of goods greatly changed.

Export problems, searches for foreign distributors, re-employment of veterans, re-equipment of plants. These are all predicted as post-war



C. T. Murchison

major concerns of textile manufacturers. Discussing the re-equipment problem, the Cotton Textile Institute president said: "During four or five years of war the condition of obsolescence will have become extreme. Depreciation will have progressed in many cases beyond the measure indicated by income tax allowances. The need for new machinery with wise selection of such machinery will probably be greater than at any previous time in the industry's history.

"The machinery manufacturers in their turn will be under a great handicap because they, too, have their problem of reconversion from the tools of war to the tools of peace. They will be under intense pressure to make available a certain portion

Wartime Research on Steel Seen Helping Needs of Peace

Much of the research now under way in steel company laboratories is aimed primarily at improving military equipment, but many of the projects are also expected to be of benefit in peacetime, according to the American Iron and Steel Institute.

Examination of a score of research projects at a number of different steel companies shows that many of the studies pertain to the improvement of alloy steels for the aircraft industry. However, much research along other lines is under way throughout the steel industry.

Among the important projects now under study are investigations into the effects of temperatures upon the properties of metal. The war has subjected steel and

(Continued on page 172)

of their output to foreign countries on account of enemy destruction or because of great textile scarcity. Yet the total output of our machinery manufacturers for a period of at least two or three years after the war will probably be less than the needs of our own country."

Fears are greater than the hopes for maintenance of the present high production levels after the post-war period of rehabilitation. These fears will accelerate renewed attention toward certain important technical developments. War experience has demonstrated the advantages of more expert selection and breeding of cotton for particular uses. Greater impetus has been given to spinning tests that show a predetermined specification can be attained through selection of specific varieties and mixtures.

The Department of Agriculture, and both the cotton breeders and farmers, are paying more attention than ever to the importance of adjusting breeding and growing programs to spinning needs as determined by careful research and tests. Fibre structure, fibre surface, fibre diameter, fibre length and all the physical characteristics are being studied in the laboratories as never before. The age-old problem of fibre slippage is on the verge of solution. These developments in cotton agriculture and in the early stages of cotton processing, when added to the accomplishments in yarn and fabric-finishing, offer much encouragement for those who have questioned the ability of cotton to compete with synthetic fibres.

Physical and economical advances in the cotton textile industry must be augmented by active merchandising and promotional programs, Dr. Murchison emphasized, saying, "Nation-wide publicity of a truly informative type, utilizing the agencies of the press, the radio, the motion picture, public exhibits and private mail pieces, can accomplish a task of education which should make immeasurably easier American acceptance of the great host of things which will be new a year from now or two years from now."

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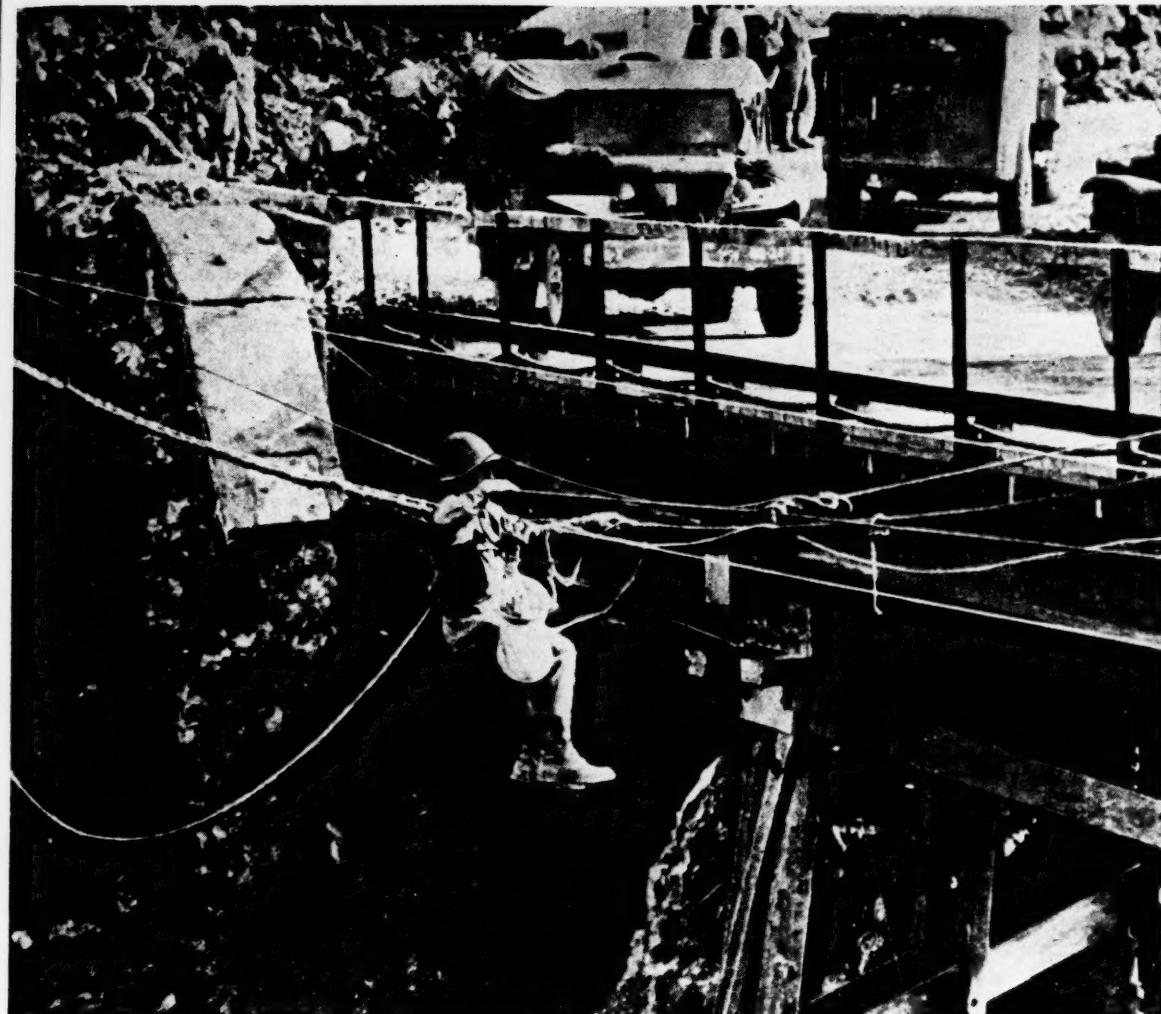
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Members of a Signal Battalion string telephone cable beside bombed bridge. This is the type of work for which the Army needed civilian volunteers

Bell System Cable Splicers Flown to Europe

"SEND thirty cable splicers immediately"... that was the gist of an urgent request from the Army shortly after the Normandy break-through.

The men were needed for building communications lines behind the retreating Nazis. Signal Corps forces already there were doing a great job but they needed help — and quick!

Many telephone men volunteered for this emergency over-

seas duty. A number were selected, granted leaves of absence, given physical examinations and flown across the Atlantic.

There are 59,000 Bell men and women in uniform. Practically all the Bell System manufacturing facilities are on war work. That's the way we know you'd want it to be — even though it means waiting for home telephones.

BELL TELEPHONE SYSTEM

IF YOU'RE WAITING FOR A HOME TELEPHONE we'd like to thank you for being so patient. You can be sure we are doing everything we can to make the widest possible use of available equipment.





Pipe Industry Turns to North Carolina Mountain Shrubs

Above—The tough rhododendron root is sawed into slices on its journey to the finished pipes. Root is delivered to the factory by farmers at \$20 a ton.

CUT off from imported material by the war, America's tobacco pipe industry is turning to the roots of mountain rhododendron and laurel and other shrubs and trees of the southern states for its briar, and is producing more pipes than ever before to supply the "smokingest" Army and Navy in history. Many pipe makers believe our native material will successfully supplant the briars formerly imported from the Mediterranean countries, adding another American industry to the ever-growing list of those that will be independent of imports for raw materials.

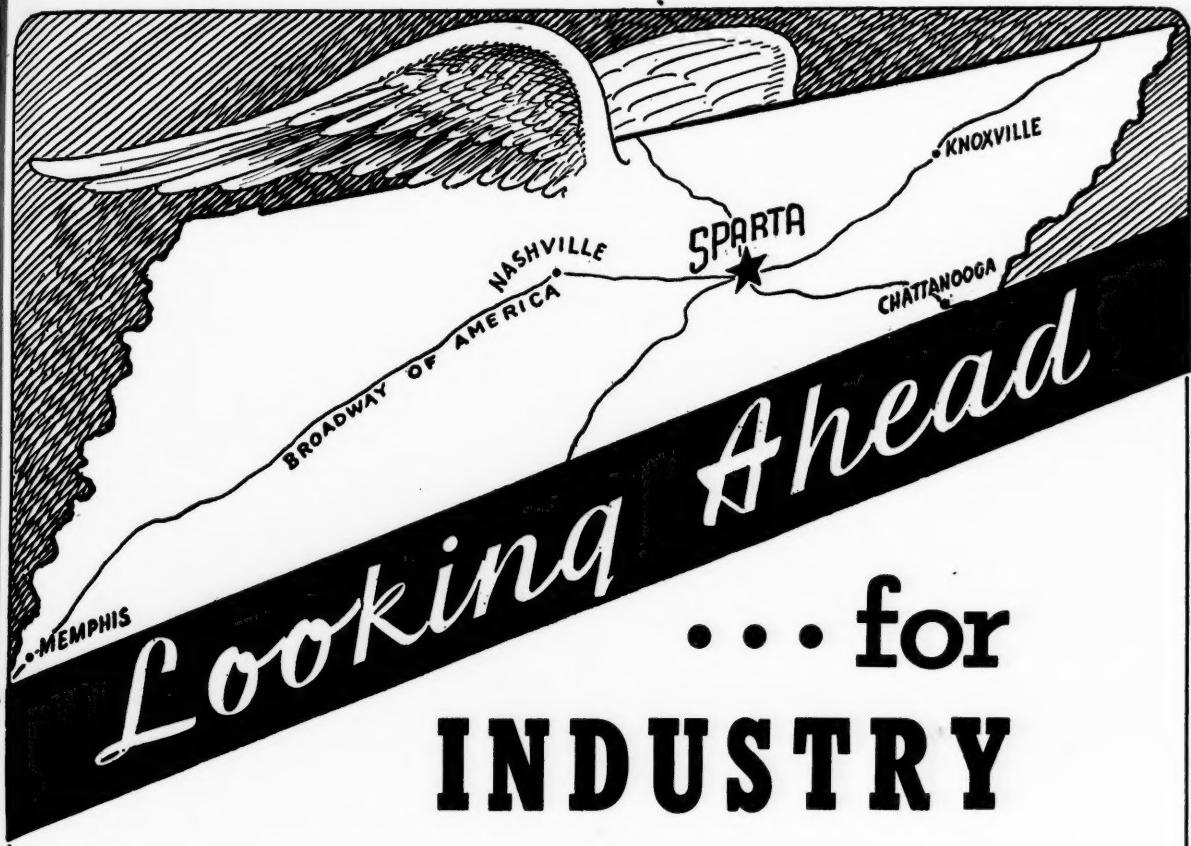
Mountain farmers in western North Carolina are grubbing up tons of "burls" and delivering them to factories in Sparta and nearby towns at \$20 the ton for manufacture into handsome briar pipes. A "burl" is an abnormal growth on a plant, roughly equivalent to a botanical wart or callous. The knotty burl is unbelievably tough and compact, and may be found not only on the rhododendron, but on dogwood and many other plants in the mountains of the South.

Nature lovers who fear the hunt for rhododendron roots for this newest southern industry will strip the Appalachians of its most beautiful flower are unduly alarmed. The rhododendron grows so profusely, especially in North Carolina, that whole mountain tops are covered with it. In fact, the mountain-

(Continued on page 168)

Below—At the left a North Carolina rhododendron root receives its preliminary shaping. Several bowls a minute can be shaped by this process. The picture at the right shows workers smoothing the pipes by means of an endless sandpaper belt.





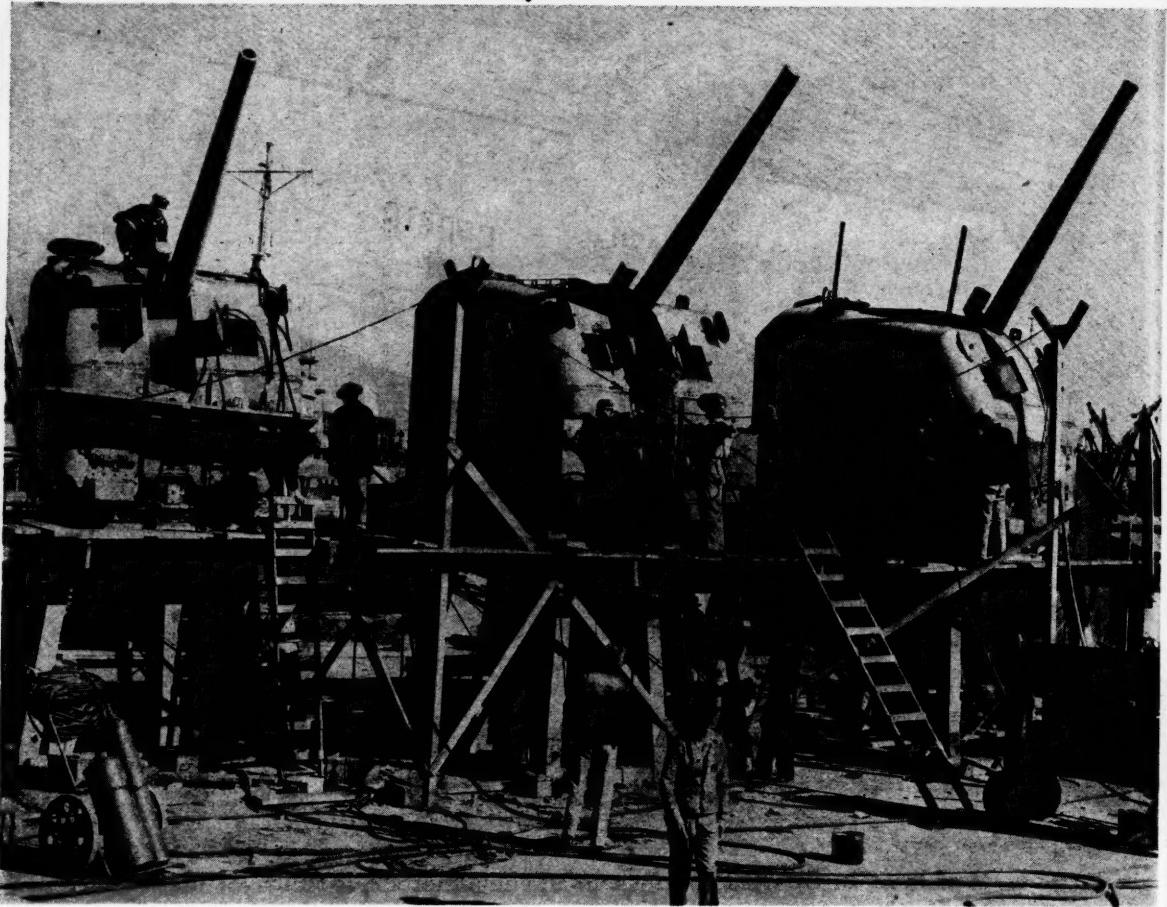
We, here in Sparta, Tennessee, in the limerock foothills of the Cumberland Mountains . . . in the heart of the Tennessee Valley, are looking ahead for Industry . . . Industry locates and develops where it has the best opportunities for profitable operation. . . . Sparta offers such opportunities. . . . An abundance of raw materials, plenty of Hydro-Electric power . . . mild climate which permits year 'round operation. . . . Native, intelligent labor that is willing and industrious. . . . All the advantages of a Southern location, situated on the "Broadway of America." . . . We invite you to locate in Sparta and enjoy the pleasure of living . . . and making money.

WRITE INDUSTRIAL COMMITTEE

SPARTA Tennessee

"One of the Best Towns on the Broadway of America"

P. O. BOX No. 209



Pre-Assembly Speeds Warship Outfitting

THROUGH pre-assembly on shore of the main battery guns mounted on warships constructed by the Charleston Navy Yard, an estimated full week recently has been cut from the time required to ready these invasion-bound ships for action.

Formerly these gun mounts, such as potent five-inchers, were hoisted on board the vessels in subassembled sections which were then fitted together to make up the complete mount. Each subassembly weighs several tons.

Now, on big outdoor platforms, ordnance machinists, electricians, shipfitters, pipefitters, and assisting trades put the guns together to the last detail and the entire unit is hoisted by giant cranes onto the ship. Then it is just a matter of fastening the gun mounts to the deck.

connecting the electrical-control circuits and making final adjustments. One of the problems involved in undertaking pre-assembly of the guns was the fact that no inside building space was available for the project. The elevated, outdoor platforms, simulating the deck mounting for the guns, was the answer.

Big tarpaulins are spread over the

turrets as protective covering from the weather while the intricate machinery controlling the guns is installed.

This latest speedup plan—one of many evolved through the teamwork of the Navy Yard's shipbuilders—is being applied on jobs of reconversion and repair as well as in building new ships.

Expansion Predicted for Rayon

The rayon industry is in strong hands, technically and financially, and in the post-war period, when more highly competitive conditions are foreseen, it promises to undergo moderate expansion, Edward B. Laufer of Laurence M. Marks & Co., New York, says in a survey of "Progress in Rayon" reported in "Chemical and Engineering News," publication of the American Chemical Society.

"The rayon industry should retain its

old customers on merit and will cut into other products, but on a more keenly competitive basis than heretofore," Mr. Laufer pointed out. "An advantage for rayon here is that the natural fibers have recovered pricewise far more than rayon. Over a period of future years, the rayon volume may be expected to show moderate gains, with normal rest periods probably more freely interspersed than

(Continued on page 182)

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Note the layout of Jackson: wide streets for health and beauty.

THINGS WORTH KNOWING about Jackson, Tennessee

Here is a city that should arouse the envy of city planners of many of our older and big cities. It was conceived with the idea that its *location* would make it an important industrial city and one that would be attractive for its people, to live and conduct a growing business. It is advantageously located as a distribution center to growing consumer markets of the Southwest, West and Middle West. It is the center of the Western Grand Division of the State of Tennessee, 85 miles east of Memphis and 146 miles west of Nashville. Here are over 32,000 citizens.

These people find employment in manufacturing in-

dustries that make veneers, hardwood lumber, store and bank fixtures, church pews and interiors, barrel headings, handles, brooms, school equipment, cotton bagging, folding cartons, chemicals, steel bridges, a wide variety of food products.

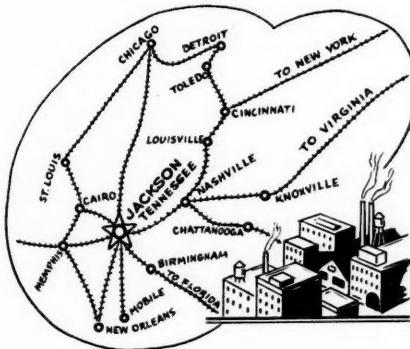
In normal times, there is an abundant supply of unskilled, semi-skilled and skilled labor. Only .003% of its people are foreign born.

An adequate volume of its city owned supply of good water is maintained for any commercial and industrial purpose.

Jackson is named for General Andrew Jackson who subsequently became the seventh president of the United States.

An important factor in the city's industrial growth is the abundant supply of cheap electric power over three transmission lines of

the Tennessee Valley Authority. If these few facts, offered as *pièce de résistance* are tempting, write for more detailed information for your new or branch post-war plant or as a place to engage in commerce and industry.



Greater Jackson and Madison County Development Committee

LOUIS J. ENGLERT, Executive Secretary

OFFICES FIRST NATIONAL BANK BLDG.

JACKSON, TENNESSEE

Sulphur Industry at Peak

THE American sulphur industry, completing a year of record-high shipments to busy Allied war plants, faces the end of the war with few of the reconversion problems of other industries, according to Langbourne M. Williams, Jr., president of the Freeport Sulphur Co.

Sulphur uses, he observes, are so widespread throughout industry and agriculture that V-Day will bring scores of peacetime needs to replace present wartime consumption. To fill these pent-up needs of a world returning to normal, sulphur producers moreover will be able to rely on the same production methods they are now employing.

In the meantime, all wartime sulphur requirements continue to be met in full despite record demands. The high rate of industrial activity, in fact, made 1944 the top sulphur consuming year. Shipments from Gulf Coast refineries reached a new all-time peak of approximately 3,500,000 long tons, compared with a previous peak of 3,401,410 tons in 1941.

Shipments exceeded sulphur production by about 350,000 tons. Production was estimated at 3,150,000 tons. Although mine stocks were reduced, they are still ample when coupled with large productive capacity to meet any anticipated emergency.

While sulphur supplies were more than adequate, the demand for sulphuric acid, the form in which most sulphur is used, was so heavy that allocations were placed in 11 Pacific Coast and Rocky Mountain states and then extended to the entire nation. To help alleviate the problem, construction of new productive facilities was started and when these new plants are ready for operation about the middle of 1945, acid capacity will rise to a new peak of over 9 million tons. Some acid requirements, chiefly those for the fertilizer program, were met by recovered acid from ordnance plants.

The fertilizer industry, one of the major consumers of sulphur, accounted for a large proportion of 1944 consumption. Production of acid phosphate, the principal fertilizer, mounted to approximately 7 million tons, an all-time high for the 12 months ended last July. New facilities increased annual capacity by more than 600,000 tons.

Requirements for fertilizer are expected to continue heavy in the post war period. Authorities believe that in the first two years after Germany's defeat Europe can supply a substantial share of its minimum food needs but heavy fertilization will undoubtedly be necessary. As many of Europe's sulphuric acid plants have been destroyed or are obsolete, the fertilizer will no doubt have to be sent from the United States. Acid freed by munitions cutbacks will probably go into fertilizer production.

Three other industries which the impetus of the war has expanded phenomenally—synthetic rubber, high octane gaso-

line and explosives—helped increase 1944 sulphur consumption to its new peak.

The synthetic rubber program came of age during the year, the new plants now reported operating at a substantial part of planned capacity. Sulphur in one or another form is used at several stages of synthetic rubber manufacture. It also helps make the high test fuel for planes and virtually all the explosives for shells.

Such older sulphur consumers as paper, steel, rayon and petroleum refining continued to account for large portions of the annual consumption. Despite anticipated difficulties in the pulp and paper indus-

try, due to shortage of pulp wood, consumption of sulphur by the industry was at a high level.

In the reported new industrial and technical developments of the year, sulphur again played its usual active role. A plant was established in Oregon to make alcohol from sawdust by the European Schoeller process employing sulphuric acid. An accelerated sulphur cure for synthetic rubber was proven superior to other vulcanization methods in producing more heat stable rubbers, and a new Thiokol polysulphide rubber was introduced, showing workability at wider range of temperature than previous types and resistance to cold flow. A method was developed to convert Nylon waste to raw materials for virgin Nylon by sulphuric acid hydrolysis.

Aluminum "Over the Top"

The aluminum industry in 1944 went far enough "over the top" in supplying war needs of the United States and its allies to permit WPB to close down entirely a number of government-owned aluminum plants, releasing thousands of workers to shell-producing plants and other critical industries which need them badly for the final, all-out victory drive, says I. W. Wilson, vice president of the Aluminum Company of America.

Even with substantial concurrent reduction in Alcoa's production, aluminum is still being made in this country at a rate three times that of the peacetime peak, he declared. During 1944, ever-increasing quantities of the metal poured into new military applications. Because of its availability, aluminum was not only returned to those military uses for which other materials had been substituted, but was, itself, substituted in many cases for other materials less plentiful in supply. The new year should see growing amounts of aluminum going into the semi-military and civilian uses which must be expanded as rapidly as manpower may be safely diverted to their development.

Prime examples of semi-military uses are airplane landing mats weighing about half as much as the previous type, and aluminum gasoline drums weighing 21 pounds each as compared with 52 pounds for those of other materials. These light drums enable our Air Transport Command to deliver each month hundreds of thousands of extra gallons of fuel "over the Hump" to China. Typical of civilian uses are aluminum hopper cars ordered by Missouri Pacific Railroad, a hopper car with aluminum sides and ends already in use on the Burlington Railroad and aluminum boxcar just completed for service on the Great Northern Railroad. Wherever possible, surplus aluminum stock left in military stores, has been utilized. A quantity of aluminum sheet belonging to the Army was recently turned over to the Navy for use as siding and roofing in the construction of Navy warehouses thereby saving other more critical materials.

Aluminum manufacturers during 1944 developed a number of new alloys of military importance and of far-reaching peacetime significance. A new Alcoa alloy, 758, has a yield strength about twice that of the strong aluminum alloys used only a few years ago, and an ultimate strength exceeding 80,000 pounds per square inch.

To help offset the shortage of high-grade domestic ores for the production of aluminum, Aluminum Company of America research laboratories completed and put into commercial operation a process which successfully uses a much lower grade ore. By the use of this Alcoa combination process which should have great future significance, a sintering operation is combined with the standard Bayer process for obtaining alumina (aluminum oxide) from bauxite and other aluminum-bearing ores.

The new process is the result of a quarter century of research and makes possible the use of low-grade ores which were considered of little commercial value before the war. A new alumina development laboratory to develop further improvements in the operating technique of this new process has just been completed at the East St. Louis Works of Aluminum Company of America. The equipment in the laboratory is arranged so that it can be connected into complete systems for any alkaline digestion or sinter process, or combination of these processes, to handle any type of raw material.

To meet urgent civilian demands for aluminum, WPB issued during the latter half of 1944, a series of authorizations for the use of the metal in cases where manpower would not be taken from essential war work and where other more critical materials could be replaced. Whenever the manufacture of a particular item was authorized, permission to use aluminum was granted. Aluminum truck and trailer bodies are now being built under WPB authorizations. Among such authorized uses of aluminum during the past year were collapsible tubes,

(Continued on page 168)

KINGSPORT

BORN IN 1917---the youngest child of COLONEL TENNESSEE---a child prodigy, who has already outstripped several of his older brothers---and of whom it has been said, "*This fellow will go far!*"

The story of Kingsport, its founding, its growth and its character, is a highly interesting story which has intrigued many people. It has been the subject of articles in national magazines, broadcasts and of special study by industrial and municipal experts. For Kingsport looks to many people like a fine example of that long sought after ideal, the city that is highly industrialized, supporting a large population, while giving to these people the opportunity to live in comfort, ease and the cleanliness of suburban and rural living.

The industrial picture in Kingsport, which lies in a valley that was almost untouched by the hand of man thirty years ago, is a combination of great industries that give employment to upwards of 20,000 people, with a total annual payroll of \$55,000,000. In and out of the yards of the Clinchfield Railroad went 65,700 loaded freight cars in 1943, with many thousands of trucks carrying more tonnage over the highways.

The great industries located here find their raw materials in the hills near the city; they find a ready supply of water and ample supply of power. They find their labor in the present descendants of hardy intelligent Scotch-Irish pioneers who settled East Tennessee.

Kingsport today is the center of a population of fifty thousand people. Not all of them live within the city limits, but by the very nature of its way of life, Kingsport minimizes the idea of city limits. The highways are alive with cars and busses at switch time, carrying workers who live inside and outside the unmarked limits of the corporation. By actual count of ration books issued at the Kingsport office, there are 50,993 of them. Kingsport's industries support these people; Kingsport's retail stores supply them with the necessities and the luxuries of life; Kingsport's professional men serve them; Kingsport's water and lights, Kingsport's hospital facilities, and other things are at the service of most of them.

From the beginning, the growth of Kingsport has been steady and strong. Kingsport is moving forward and upward. This growth is best shown by the following tables.

| Year | Bank Deposits (millions) | P.O. Receipts (thous.) | Employed in plants | Wages (millions) | Freight Traffic (thous.) | Phones |
|------------|--------------------------|------------------------|--------------------|------------------|--------------------------|--------|
| 1935 | 3.5 | 82.5 | 3,824 | 3.2 | 28.3 | 1965 |
| 1939 | 5.5 | 137.9 | 7,887 | ... | 38.3 | 3216 |
| 1940 | 6.3 | 145.1 | 9,070 | 12.5 | 46.9 | 3802 |
| 1941 | 8. | 179.4 | 12,000 | 15. | 62.3 | 4500 |
| 1942 | 13.5 | 246.1 | .... | 21. | 64.5 | 5001 |
| 1943 | 15. | 537.1 | 19,672 | 55. | 65.7 | 6750 |
| 1950 | ? | ? | ? | ? | ? | ? |

KINGSPORT, TENNESSEE---SYMBOL of the NEW SOUTH

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December Southern Industrial Expansion

ALABAMA

MONTGOMERY — building — Bear Lumber Co., has contract at \$96,000 for Capitol Stockyards, cost \$100,000.

WILSON DAM — War Production Board considering advisability of installing phosphorus furnace at Tennessee Valley Authority's plant.

ARKANSAS

HOT SPRINGS — Extension — State Utilities Commission granted permission to Arkansas Power & Light Co., Pine Bluff, for extension of rural electric distribution lines in Hot Springs National Park area of Garland county, for 100 miles; cost \$99,498.

PINE BLUFF — transmission line — State Utilities Commission, Little Rock, granted permission to Arkansas Power & Light Co. to build a 110,000 volt transmission line from Pine Bluff to Helena at cost of \$84,200 and a 66,000 volt line from Slovak to Hazen at cost of \$29,000.

FLORIDA

BARTOW — plant — Defense Plant Corporation will construct plant to be operated by Kuder Citrus Products Co., of Bartow; cost about \$250,000.

JACKSONVILLE — factory — Elkor Manufacturing Co., will establish furniture plant.

JENSEN — plant — Sperte & Co., plans construction of agar-agar plant; cost, \$100,000.

MIAMI — plant — Braeknit Sportswear, Inc., plan construction of modern knitting plants in Miami.

PLANT CITY — plant — Formation of Citrus-Products Co., Division of Russell Black and Co., locating canning plant, capable of processing 800,000 to 1,000,000 boxes of fruit each season.

GEORGIA

ATLANTA — factory building — Hugh Walton, has contract at \$25,000 for construction of factory building for Meadows Manufacturing Co.

EASTMAN — plant — Advanced Refrigeration Co., has contract for solid brick building for freezer locker plant; York Refrigeration Co., has contract for refrigeration; cost, \$20,500.

EASTMAN — plant — North Bros., Atlanta, has contract for freezer locker plant.

EATONTON — mill addition — Enterprise Aluminum Co., will construct an addition to mill; owner builds.

GRIFFIN — mill addition — Newton Coal & Lumber Co., has contract for construction of mill addition to Dundee Mills.

MACON — abattoir — City, completing plans for construction of another abattoir.

SANDY SPRINGS — plant — R. E. Spearman and G. R. W. Underwood, RFD No. 1, Dunwoody, contemplate construction of freezer locker plant.

KENTUCKY

LOUISVILLE — building — Reynolds Metals Co., plans acquiring building housing its Plant No. 12 at Dixie Highway and Burnett Avenue; to be used for manufacture of aluminum kitchen utensils, beer barrels, etc.

LOUISVILLE — expansion — Defense Plant Corp., increased contract with Tube-Turns, Inc., to provide additional equipment at plant to cost \$1,400,000 resulting in an over-all commitment of \$4,450,000.

LOUISIANA

ABBEVILLE — locker plant — Louis M. Thomas, plans construction of locker plant to consist of 250 lockers.

COUSHATTA — food locker plant — Frozen Food Locker Construction Co., Memphis, Tenn., has contract for installation in Red River parish of a frozen food locker plant to be located at Coushatta; will have 250 lockers, cost about \$13,000.

COVINGTON — plant — Consolidated Vultee Aircraft Corporation, New Orleans, plans establishing an auxiliary plant at Covington.

NEW IBERIA — locker plant — War Food

Administration approved construction of frozen food locker plant; H. M. Faures, interested.

OPELOUSAS — plant — Simon Stelly and L. A. Quebedeaux, operating Rose Dairy, plan erection of larger plant.

PONCHATOULA — warehouse — Parker & Vaughan, constructing warehouse and cold-pack plant.

MISSISSIPPI

HEIDELBERG — refinery — Rogers Lacy of Longview, Tex., plans establishment of refinery in Heidelberg area.

JACKSON — plant — Adler Manufacturing Co., Louisville, Ky., plans erecting plant for manufacturing radio cabinets, etc. Work to begin as soon as priorities can be obtained.

ROBINSONVILLE — pipeline — Memphis Natural Gas Co., Memphis, starting work on construction of pipe line from Robinsonville, Miss., to Lula 31-miles.

MISSOURI

CASSVILLE — factory — Marlin Manufacturing Co., will occupy building to be erected by the City for shirt manufacturing plant; will install 100 machines.

KANSAS CITY — plant — Louis Plotzky, of Kansas City Boyswear Co., purchased 7-story building, for future expansion.

ST. LOUIS — building — Kloster Co., has contract for factory for American Syrup and Sorghum Co., cost \$15,000.

ST. LOUIS — expansion — Central States Paper & Bag Co., acquired building, post war expansion.

ST. LOUIS — expansion — Thomas J. Sheehan Co., acquired site for post war expansion.

ST. LOUIS — foundry — National Foundry & Machine Co., erecting brick and steel foundry, cost \$20,000.

ST. LOUIS — improvements — Cook Paint & Varnish Co., plans modernizing structure; post war.

ST. LOUIS — improvement — Ritepoint Co., acquired site for erection of factory.

ST. LOUIS — plant — Arel Photo Supply Co., 918 Delmar Blvd., acquired group of buildings; expend \$25,000 for improvements; post war.

ST. LOUIS — warehouse — Gamble Construction Co., has contract for warehouse for Busch Sulzer Brothers Diesel Engine Co.; cost \$50,000.

ST. LOUIS — warehouse — Gereke-Allen Carton Co., started work on 1-story warehouse adjoining present plant; cost \$30,000.

NORTH CAROLINA

ASHBORO — plant — C. H. Wood, Ashboro, has contract for plant for Stedman Manufacturing Co., manufacturers of handkerchiefs; cost \$20,000.

BURLINGTON — plant — Firestone Tire and Rubber Co., will install an armament plant in the Fairchild Building.

BURLINGTON — plant — U. S. Rubber Co., has leased vacant industrial building, plans installing modern manufacturing plant; will start installation of machinery this month.

OLD FORT — plant — Clearwater Manufacturing Co., acquired site at Old Fort for rayon dyeing and finishing plant.

OLD FORT — plant — United Merchants and Manufacturers, Inc., plans erecting textile finishing plant in Old Fort.

RALEIGH — shop building — J. M. Thompson & Co., Raleigh, has contract at \$14,000 for machine shop building, for Herring Sash & Door Co.

ROCKINGHAM — plant — Hannah Pickett Dyeing and Finishing Co., Incorporated with \$500,000 capital; to dye and process materials.

ROCKY MOUNT — station — Josh L. Horne filed application with Federal Communications Commission for authority to construct a new high frequency broadcasting station.

SHELBY — plant — Barger Bros., Mooresville, has contract for milk processing plant for Carolina Dairy. Cost \$22,922.

WAYNESVILLE — locker plant — Farmers

Federation acquired building; will install freezing and storage equipment.

WILMINGTON — rails — Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., has received an order from Atlantic Coast Line Railroad for 60,000 tons of rails at approximately \$2,000,000.

SOUTH CAROLINA

ANDERSON — building — C. M. Guest & Sons, Anderson, has contract at \$24,000 for construction of a manufacturing building, for Anderson Utilization Co.

CHARLESTON — pier — Plans have been completed to restore and modernize the United Fruit Co.'s banana piers, destroyed by fire Oct. 6; Southern Railway Co. owner; will start work soon; new dock will have 6 instead of 2 tracks for handling freight cars; install new equipment; dock will be built on site of old pier; in addition a large classification shed, a 2-story brick office and utilities building, a brick oil house, 3 covered island loading platforms and new loading tracks will be constructed; modern mechanically operated loading and handling machinery will be installed by United Fruit Co.; rebuilt pier will be 440 ft. long and 54 ft. wide.

EDGEFIELD, AIKEN — plants — Riddell & Bickell, Greenville, have contract for construction of freezer locker plants.

GREENELEYVILLE — plant — Whitfield Park, closed contract to install a complete modern locker plant.

TENNESSEE

JOHNSON CITY — freezer locker plant — D. R. Beeson, Archt., for construction of freezer locker plant; cost, \$18,000.

SOUTH CAROLINA

LAURENS — plant — C. G. Shockley Construction Co., Columbia, has contract at approximately \$30,000 for construction of freezer locker plant for Laurens Electric Corp.

TENNESSEE

Tennessee Gas & Transmission Co., Chattanooga, Tenn., petitioned the Federal Power Commission for permission to connect its interstate line with 11 Texas oil and gas fields now having no outlet for natural gas; company proposes to make connection with gas fields and vented gas in following counties: Bee, Jim Wells, Victoria, Aransas, Patricio, Nueces, Jackson, Wharton, Matagorda, Colorado, Refugio, Calhoun; waste gas would be salvaged from operations in Odom, Tom O'Connor, Reguglo, Heyser, Placido fields.

CLARKSVILLE — addition — Hughes-Foulkrod Co., Philadelphia, Pa., has contract for plant addition for B. F. Goodrich Tire & Rubber Co., Akron, Ohio.

MEMPHIS — cold storage plant — Tennessee Cold Storage Co., let contract to V. & M. Construction Co., for modern cold storage plant; cost \$150,000.

MEMPHIS — expansion — Hunter Fan & Ventilating Co., acquired building, at 387 S. Main St.; plans doubling size of present building.

MEMPHIS — plant — Shelby Furniture Manufacturing Co., acquired 8½ acres for postwar factory and residential development; expend \$200,000.

MEMPHIS — plant — War Production Board permitted Buckeye Cotton Oil Co., to erect and operate a pulp plant, costing about \$3,000,000.

PARIS — chinaware — Russell Potteries Co., chartered by Duey P. Russell, Will T. Warren, Jr., manufacture crockery.

TEXAS

Chemicals — Jefferson Chemical Co., Inc., formed by The Texas Co. and American Cyanamid Co., to engage in the manufacture and sale of chemicals from petroleum.

Pipe Line — American Light and Traction Co., United Light and Power Co., Charleston, W. Va., parent company, filed with Securities and Exchange Commission, Philadelphia, an amendment to a plan to construct a \$70,000,000

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General view of the Tennessee Eastman plant

TENNESSEE EASTMAN is the producer of two nationally known products—Eastman acetate rayon and the plastic Tenite. It supplies the base for all Kodak safety film. One of the largest manufacturers of cellulose acetate, Tennessee Eastman is the source of a growing number of allied chemical products, raw materials which serve a wide variety of industries. Among these products are:

EASTMAN ACETATE RAYON. For men's and women's wear fabrics—Koda, a continuous filament yarn; Teca, a *crimped* staple fiber.

TENITE I and II. Cellulose acetate and cellulose acetate butyrate plastics—tough, easily molded, unlimited in color range.

EASTMAN ACETATE DYESTUFFS. Superior quality dyes for acetate rayon fabrics.

CELLULOSE ESTERS. For photographic film, transparent sheeting, wire insulation.

HYDROQUINONE. Anti-oxidant used in synthetic rubber, and in photographic developers.

TE-3 and TE-4. Chemical inhibitors for aviation and all-purpose gasoline.

WOOD DISTILLATION PRODUCTS. Acetic acid and charcoal.

TEC LUMBER. Hardwood for building operations.

TECMANGAM. A manganese product for sulphate feed-stuffs and fertilizers.

FLOTATION OILS. For ore separation.

Tennessee Eastman's research laboratories are in constant use as proving grounds for new products. This strict laboratory control safeguards a valued reputation for quality.

TENNESSEE EASTMAN CORPORATION

(Subsidiary of Eastman Kodak Company)

KINGSPORT, TENNESSEE

Industrial News

Chapman V. P. of Virginia Bridge Co.

At a meeting of the Board of Directors, Dec. 21, Marion E. Chapman was elected Vice-President in charge of sales of the Virginia Bridge Company to fill the position left vacant at the death of Mr. B. L. Sneed. He was also elected a director of the Company.

A native of Austel, Ga., Mr. Chapman attended school and spent most of his life in the vicinity of Roanoke. He attended Roanoke College, University of Virginia and graduated in civil engineering at the Virginia Polytechnic Institute. Mr. Chapman has been with the Virginia Bridge Company for 28 years.

Miller of Utica to Represent S-C-T Company

Standard-Coosa-Thatcher Co., of Chattanooga, Tenn., and Philadelphia, Pa., has announced the appointment of Carl L. Miller & Sons of Utica, N. Y., (P. O. Box 105) as sales representatives for Standard Mercerized Yarns in the State of New York, beginning January 1, 1945. They will replace the Rowen-Gardiner Company of Amsterdam, N. Y. Carl L. Miller & Sons have for a number of years handled unmercerized combed and carded yarns and are well-known in the New York State and other markets.

Busch-Sulzer Appointments

The Busch-Sulzer Bros.-Diesel Engine Co., St. Louis, have announced the appointment of Joseph G. Bros as vice-president in charge of sales and of Charles E. Beck as Sales Manager. Mr. Bros was formerly Sales Manager of the Diesel Division of Baldwin Locomotive Works, while Mr. Beck has served in Busch-Sulzer's sales department for the past 26 years.

Jefferson Chemical Officers

Appointments of Dr. M. Neuhaus as director of research, L. P. Scoville as chief engineer, and J. M. Porter as chemical engineer, were announced recently by P. M. Dinkins, vice-president and general manager of the newly formed Jefferson Chemical Co., jointly owned by the Texas Company and American Cyanamid Co. Dr. Neuhaus has been associated with the Texas Company for the last twelve years in its producing and refining departments. Mr. Scoville has been associated with the Texas Company for over twelve years, while Mr. Porter has been with the American Cyanamid Company since 1928.

New Dry Chlorine Dioxide Generator

A new model of the generator which produces dry chlorine dioxide gas from chlorine and dry sodium chlorite has been developed by The Mathleson Alkali Works. The chlorite is now contained in a reaction tower within the control unit, in contrast with earlier models which required separate chlorite towers. Removable front and sides make all parts of the unit easily accessible for servicing. The new generator measures five feet in height, two feet in width, and eighteen inches in depth.

This equipment is used commercially to generate chlorine dioxide, a gas with 2½ times the oxidizing power of chlorine, for the dry bleaching of starch, wheat flour, high-fat soy flour and wool grease, and for checking blue mold in citrus fruits. Chlorine dioxide is also used in solution, in bleaching soap, paper and textiles, and in removing objectionable tastes and odors from public water supplies.

Birmingham Metallurgical Agent

Pittsburgh Metallurgical Co., Inc., producers of ferro alloys, with plants at Niagara Falls, N. Y., and Charleston, S. C., recently announced the appointment of W. O. McMahon, foundry consultant of 108 Mecca Ave., Birmingham, Ala., as Birmingham district sales manager. Mr. McMahon has had many years experience with the metal trades in the southern states and in his new position will handle the company's ferro-alloys, Bessemer ferrosilicon pig iron and high-carbon ferrochrome.

Rust Installing Special Coal Handling Equipment for Avondale Mills

Installations to handle coal direct from cars to firing apparatus are being designed in part and installed at Avondale Mills, Sylacauga, Ala., by the Rust Engineering Co., Birmingham, Ala.

The equipment consists of track hopper and grating with spout to flight feeder, which feeds coal to bucket elevator, which in turn feeds to a tall silo of approximately 200 tons capacity. From the silo, coal is fed to an automatic scale and then spouted to pulverizers. Provision is made to spout excess coal from the silo to dead storage on ground.

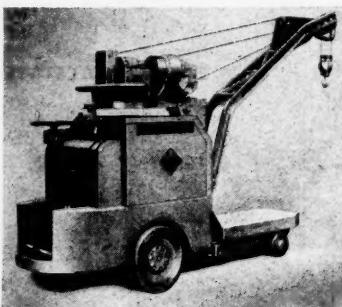
New Office Building for Kennametal Inc.

A new office building, for which ground was broken last summer, has now been completed, and is occupied by Kennametal Inc., Latrobe, Pa., manufacturers of cutting tools. The new building, built around the old one which was renovated, provides increased facilities required for the company's expanding engineering, and research departments.

Combination Crane Truck has Wide Material Handling Range

A new model L-11C combination crane truck announced by The Elwell Parker Electric Co., Cleveland, Ohio, has improved operating characteristics due to the addition of a separate motor for raising and lowering the boom, say the manufacturers. In previous models a single motor served to raise and lower both boom and hook by means of a ratchet boom adjustment which was actuated when the lift hook was pulled up against the boom. By providing a separate motor for each function the operator is given a greater freedom of choice in manipulating the load.

The combination crane truck is a 4-way truck, serving as a lift-truck, a load carrier, crane and tractor. It loads itself either by



picking up skid loads with the lift platform, or by lifting heavy parts and placing them on the platform for transport. As a tractor it pulls trailer cars, which may be loaded by means of the crane. The crane may be made available for heavy lifting at points where there are no overhead cranes. The model illustrated has a capacity of 6,000 pounds on the platform, 2,000 pounds on the hook at 42-inch radius and 1,000 pounds on the hook at 84-inch radius. It will travel at 6 miles per hour with no load and 5 miles per hour with full load under normal conditions. The platform is deeply flanged to insure rigidity and has three point positive support that assures load stability at all times.

Rheem Switches to Heavier Shells

Having made, since April 20th, 1944, two and a half million 76 mm. brass shell cases, Rheem Manufacturing Co.'s Birmingham, Ala., plant recently switched its production to 90 mm. shell cases. The plant was not scheduled to begin manufacture of the larger shell cases until this month. By stepping up its schedule in response to General Eisenhower's appeal for greater production of ammunition, fourteen days have been saved. This plant turned out 76 mm. shell cases at the rate of 13,100 per day.

Lunkenheimer Executive Changes

Frank P. Rhame, a Director and vice-president and assistant general manager of The Lunkenheimer Company, valve manufacturers, has been made general manager, succeeding Charles A. Brown, who retired December 31. Mr. Rhame has been associated with The Lunkenheimer Company for over 25 years. Homer E. Lunken, a director, succeeds him as assistant general manager. Carral L. Lans has been named Works Manager, succeeding George A. Seyler, retired. Fred H. Hehemann, assistant chief engineer, becomes chief engineer, succeeding Jerome J. Aull, retired. Harry A. Burdorf remains as a director and vice-president in charge of sales.

Pittsburgh Glass Appoints Kluth

Appointment of Harry R. Kluth, 50, of Philadelphia, as general manager of the Pittsburgh Plate Glass Company's 77 warehouses, effective January 1, has been announced by vice-president R. B. Tucker. Mr. Kluth succeeds Frank Clarke, who moves to Brooklyn as warehouse manager and Eastern manager. He started as an office boy for the Company 35 years ago in its Philadelphia branch. In 1925 he was made manager and a year later district manager. H. E. Zoll succeeds Mr. Kluth, Philadelphia.

United States Plywood Territory Enlarged for Ramsey

S. W. Antoville, sales director, United States Plywood Corp., announces that the sales territory of its distributor, A. H. Ramsey & Sons, Inc., of Miami, has been enlarged to embrace almost half the state of Florida to a line slightly north of Tampa, and including St. Petersburg. Formerly the Ramsey firm's territory included only eight counties in and around Miami.

Crane Personnel Shifts

Effective January 1, L. R. Bauer, formerly manager of the Brooklyn and New Haven branches, Crane Co., valve manufacturers, became manager of the Jacksonville, Fla., branch, succeeding R. E. Penney, transferred to Los Angeles. F. A. Duncan, manager of the Memphis, Tenn., branch, retired after 42 years service. He was succeeded by O. F. Woodyard, former manager of the Little Rock, Ark., branch. Mr. A. C. Gribble, salesman at the Houston, Texas, branch was promoted to the Little Rock post.

McDonough Opens Atlanta Office for Permite Products

Aluminum Industries, Inc., Cincinnati, Ohio, manufacturer of Permite Products, has announced the opening of a new sales office at 413 Grant Building, Atlanta, Ga., to accommodate the Southern division manager and territorial representatives of the Automotive Replacement, Industrial and Paint Divisions of the company.

W. E. McDonough, southern division manager, will be in charge of the new office. Mr. McDonough has been with Permite for 20 years as Atlanta representative and district manager of the Automotive Replacement Parts Division.

Baldwin Locomotive After Post-War Plastics Trade

Baldwin, builder of locomotives and huge machines, is making an aggressive bid for a substantial share in post-war plastics. Its number one entry, just developed is a vertical hydraulic "hypspeed" press that molds plastic items and utilizes electronic heating of the plastic material to effect sensational economies in production time, according to Ralph Kelly, president of The Baldwin Locomotive Works.

Held secret until now, experiments have been conducted for months in The Bryant Electric Company Hemic plant in Bridgeport, Conn., on resins, ureas, and melamines, vital to the process. Also working with Baldwin's Southward Division to create the method were the Electronic Division of the Westinghouse Electric and Manufacturing Company and the Monsanto Chemical Company, Plastics Division, Springfield, Mass.

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To the Executive Who likes to FISH and HUNT on Saturdays!

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—national distribution is profitable in Johnson City...

—raw material in mineral and timber from adjacent mountains...hydroelectric power...closest neighbor to the coal fields...powerful rivers for industrial use...

—a pleasant valley of Blue Grass farmland producing poultry, dairying, burley tobacco, truckage, commercial seeds....

—OUR PEOPLE ARE OUR GREATEST ASSET, Mr. Executive!

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HON. WELSFORD ARTZ, Mayor

Johnson City Chamber of Commerce, Inc.
HON. WALLACE V. CALVERT, President

Inquiries invited

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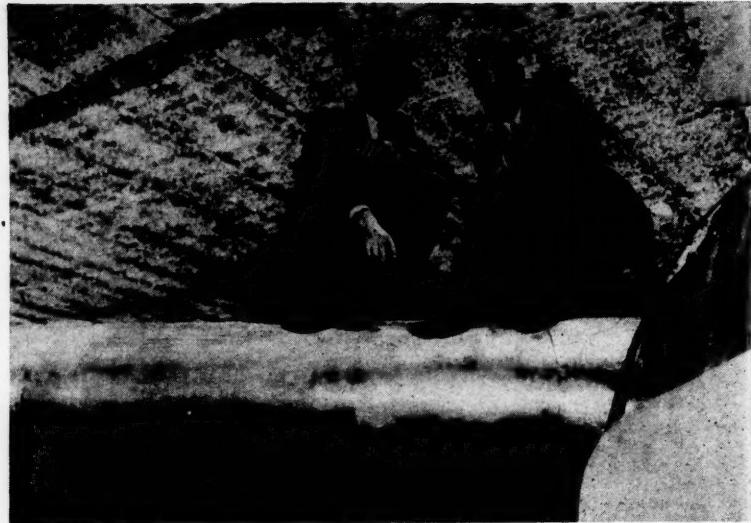


THE quest for a method of constructing airplanes in order to obtain smooth exterior surfaces and stronger assemblies has resulted in development of a metal adhesive by Consolidated Vultee Aircraft Corporation. The new high strength adhesive, called Metlbond, has successfully passed rigorous tests and is replacing other means of attachment for some structural and secondary parts of aircraft.

Flush riveting and spotwelding have found extensive application in high speed aircraft, but even these methods have objectionable features. A Metlbonded joint between two pieces of aluminum-alloy can be made stronger than a comparable riveted or spotwelded assembly. Stiffness of Metlbonded assemblies exceeds those having intermittent type fasteners such as bolts, rivets and spotwelds. From an economy standpoint, the Metlbonding process has an advantage over other methods. Unskilled employees can be trained to make acceptable assemblies in less than a week, compared to a much longer time required to train riveters and welders.

There are certain applications, however, where adhesives are not satisfactory. For most uses, Metlbond is satisfactory between temperatures of -70° F. and 250° F. Its use would be excluded in such assemblies as exhaust systems or other parts subjected to high temperatures. On parts which require frequent repair, riveting is more practical in most cases because of the equipment necessary for using Metlbond.

Research engineers had to develop an adhesive which met several requirements. A adequate shear strength is one of the most important factors in a structural adhesive, but is not necessarily the most difficult to attain. The cement must have sufficient flexibility to withstand impact loads. It must have resistance to heat and cold, aromatic solvents and salt water. In addition, it must have resistance to aging and to fatigue. The fulfillment of these physical properties alone does not necessarily produce an adhesive suitable for industrial use. In order to make an adhesive practical for production purposes, it must make joints which are not only superior in quality, but also less expensive than other methods



Metlbond---a Versatile Adhesive for Metals

by

Dr. Glenn G. Havens
*Design Staff Engineer,
Consolidated Vultee Aircraft
Corporation*

of attachment.

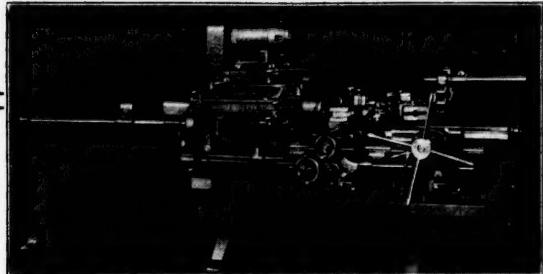
At the beginning of the project, the research group examined various adhesives then available. Some cements manufactured for the purpose of bonding metal to metal or metal to other materials were found to have satisfactory physical properties when used under controlled laboratory conditions. However, pressures of 500 to 1000 psi had to be applied. The film thickness of cement had to be kept within one thousandth of an inch and metal surfaces had to be perfectly matched. Special preparation of

(Continued on page 174)

Above—T. P. Hall, chief development engineer, and Bruce Smith, chief design engineer of Consolidated Vultee Aircraft Corp., inspect a Metlbonded leading edge of an experimental bomber.

Below—A wing bulkhead assembly joined with Metlbond. The dark spots are holes which would be necessary if riveting was used.





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NEW Machinery

NEW Skill

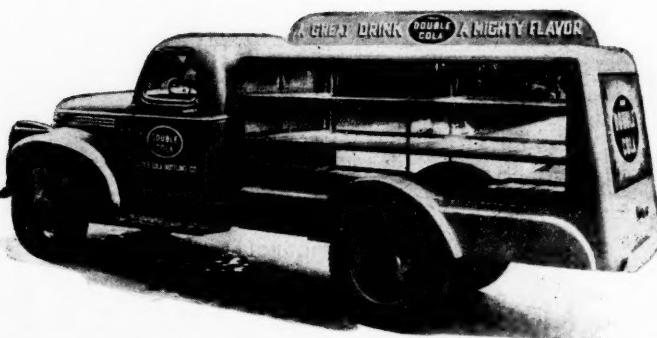
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Right here in Johnson City we are today turning out hundreds of thousands of machine parts that require accuracy to a fraction of a thousandths of an inch.

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**"AN INSTITUTION DEVOTED TO THE COMPLETE DEVELOPMENT OF THE
AREA IT SERVES"**

GENERAL OFFICE: JOHNSON CITY, TENNESSEE

TRADE LITERATURE

INFRA-RED DRYING

J. O. Ross Engineering Corp., 350 Madison Ave., New York 17, N. Y., has issued a new bulletin, No. 145, detailing uses and operations of their "Airay" infra-red drying equipment.

X-RAY INDUSTRIAL USES

A new 4-page leaflet describing "X-Ray Diffraction—An Industrial Tool," has been announced by North American Philips Company, Inc., 100 East 42nd Street, New York. It explains the technique employed in film-type X-ray equipment for identification of materials. Simple sketches representing typical diffraction films are exhibited in order to show how comparisons are made. Industrial applications for X-ray diffraction listed include: Establishment of identities in ceramic clays; Checking ingredients of dairy products; Quality tests on soapstone before firing; Determination of covering quality of paint pigments; Differentiation of natural and artificial pearls; Identification of aluminum oxide modifications; Differentiation of inorganic fibers; Metallic deposition in formation of metallic carbides, and Determination of character of metallic films.

FINE WIRE DRAWING

An 8-page folder titled "Some Problems Influencing the Drawing of Fine Wire," by H. P. Edinga, Wire Division Manager, has been announced by North American Philips Company, Inc., 100 East 42nd Street, New York. The folder describes the importance of fine wire in the world of today and discusses drawing problems particularly with respect to the cold-drawn types. Machines, Labor, Lubrication, Diamond Dies and Production Output are a few of the items mentioned in the discussion.

MATERIALS HANDLING

In the latest issue of "Handling Materials," house organ of Towmotor Corporation, Cleveland, Ohio, the methods used by stevedores to expedite many varied handling operations are discussed in an illustrated and informative article based on actual on-the-scenes reporting. The Towmotor article was written for readers concerned with handling materials in factories, terminals and warehouses, who are naturally curious about methods employed by those who specialize in handling materials. Copies of the house organ containing the article can be had on request by writing Towmotor Corporation, Cleveland 10, Ohio.

BANDING AND SPLICING

A six-page folder on the Punch-Lok method of banding and splicing electrical applications has just been published, and copies may be obtained from The B. F. Goodrich Co., Akron, Ohio, which distributes the product nationally. The folder describes the tools used in the Punch-Lok bands on many electrical jobs the Punch-Lok method. Lists sizes of pre-formed and open end clamps available in Everdur, a copper brass alloy for electrical use, and tells in step-by-step detail how to apply the Punch-Lok bands on many electrical jobs such as connecting, splicing, reinforcing, tying and repairing lines.

CAST METALS HANDBOOK

The 1944 edition of the A. F. A. Cast Metals Handbook, now available, represents a most extensive revision from the previous edition (1940). It deals exclusively with the engineering properties of cast metals and has been prepared especially for use by those who design metal parts and who specify or purchase cast metals for industrial products. Published by American Foundrymen's Association, 222 West Adams St., Chicago 6, Ill. Cloth bound, 745 pages, 258 illustrations, 204 tables, Price \$6.00.

COMPAR PRODUCTS

Resistoflex Corporation, Belleville, N. J., announces a new 16-page illustrated catalog of industrial products made from compar, the

specially compounded solvent-proof vinyl resin. The properties, characteristics and specifications of each industrial product are contained in twelve illustrated sections. A question and answer section of the catalog sets forth general information on the high tensile strength of compar, its impermeability to organic solvents and wear, its low permeability to industrial and refrigerant gases and its almost complete freedom from aging and oxidation.

CONTRACT TERMINATIONS MANUAL

A new manual of procedure on contract termination, which is believed the only one of its kind and which will undoubtedly be of tremendous help to all businesses and industries concerned with the problem, has been made available by Jack & Heintz, Inc., for use of its vendors and sub-contractors. The manual was prepared by J. Allen Praether, director of the contract terminations department of the company.

This manual contains 137 pages, including numerous working diagrams and forms, for assistance to users, and presents in detail the exact steps and procedure following receipt of notice that a contract for purchase order emanating from a government agency has been terminated.

Beginning with the receipt of the official notice, the manual carries the handling of termination problems through 14 steps and ends with the method for filing the claim in a form acceptable to the government agency involved and complying with Procurement Regulation No. 15, which is based upon the Contract Settlement Act as passed by Congress.

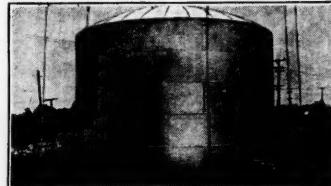
A feature of the manual is its simplicity of expression and treatment. It is applicable to, and can readily be understood by, the small vendor who may not readily obtain printed forms but who, with the aid of the manual, is enabled to make typewritten duplicates of the sample forms shown. These forms may be filled in by the user so long as he has the material and information necessary to meet data required by Procurement Regulation No. 15. The 14 steps outlined for vendors are applicable to any other terminated contract with any other prime contractor.

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This applies to field as well as shop built equipment.

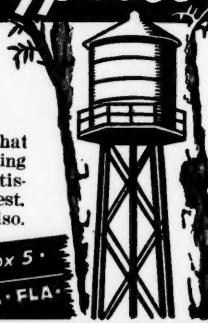
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Age Old Cypress.
50 Years' Experience

That's the combination that plants old and new are utilizing with day-in and day-out satisfaction. Catalogue on request. Ask about our wood pipe, also.

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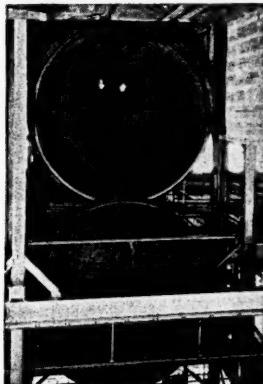


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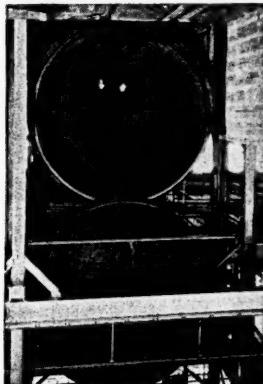
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General Steel Plate Construction
designed for your requirements.

LANCASTER IRON WORKS, INC.
LANCASTER, PENNSYLVANIA

Norfolk & Western Making West Virginia Improvements

EXTENSIVE improvements now being made at the Williamson, W. Va., engine terminal of the Norfolk and Western Railway will help speed wartime traffic by increasing the availability of locomotives for hauling troops, munitions, war equipment, bituminous coal and other vital traffic. It is estimated that the improvements will save 38 locomotive days per month or 456 per year.

The project includes the retirement of several buildings and their replacement with structures and equipment of the most modern design. New buildings and facilities will include: a modern, brick and glass block engine service building, 60 feet by 165 feet, with two 135-foot inspection pits; a three-track concrete engine washing platform, 140 feet long, combined with ash handling facilities which will serve six tracks; an improved track layout; four standpipes with necessary piping; a shelter house, 10 feet by 15 feet; two ice houses, 15 by 20 feet, and a concrete roadway, 12 feet wide and 1,200 feet long.

Buildings and facilities to be retired in order to make way for the new structures and track layout include: the west roundhouse with its 100-foot turntable; one stall of the east roundhouse; one bay of the machine shop; the carpenter shop building; two concrete engine washing platforms and engine wash shed; four ash

hoists between the coaling station and the west roundhouse; four engine inspection pits and the wheel shop building.

The new engine service building will rank among the most modern in the country. The four huge doors of the double-tracked structure will be electrically operated, pushbutton-controlled. Modern methods of ventilating, lighting and heating will be employed in this building, with heat to be supplied both by steam pipes in the concrete floor and by thermostatically-controlled heaters. The most modern pressure lubrication equipment also will be provided in the new engine service building.

Combined engine washing and ash handling facilities will embody an innovation aimed at providing increased speed and greater cleanliness.

The importance of the Williamson engine terminal in helping to keep important traffic rolling is shown by the fact that locomotives used on two divisions of the railway—the Pocahontas and the Scioto— including a total of 918 miles of track, are serviced, repaired and turned at this terminal.

Seaboard Sells the South

"Nature Favors the South!", a special brochure prepared by the Seaboard Airline Railway, carries reproductions of the railroad's advertising that has appeared in industrial, professional and daily publications during the past year. Each state

served by the Seaboard has received special treatment, while the theme, Nature Favors the South, is stressed in a special series dealing with industrial, agricultural, mineral and other natural advantages of the southern states. A brief foreword by Warren T. White, Special Assistant to the Receivers, interestingly outlines Seaboard's continuous efforts to broaden and strengthen the South's economy.

Railroads Break All Records

All previous transportation records were broken in 1944 by the nation's railroads, according to J. J. Pelley, President, Association of American Railroads. During the year, Mr. Pelley's statement continued, the railroads handled the greatest volume of freight and passenger traffic in their history, without serious transportation difficulties.

Freight traffic moved by the railroads in 1944 approximated 740 billion ton-miles, a gain of 1.8 per cent over 1943. Freight carloadings totaled 43,441,268, a gain of 1,001,315 cars.

Financially, the railroads did not fare as well as in previous years. Although gross revenues continued to follow the line of increasing traffic, the peak in net earnings was reached in 1942 and has been declining since then. Higher wages, increased taxes and increased cost of materials and supplies are mainly responsible for the net revenue decline.

RUBEROID

STONEWALL BOARD for Industrial Construction and Production



There are at least 40 places in the average plant where Stonewall Asbestos-Cement Board will do a better job . . . wherever a structure or a product or a process must resist fire, rust, rot or corrosion.

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Stonewall Board is highly satisfactory for exterior siding over existing sidewalls or rough sheathing, or direct to skeleton-frames, for sheds, etc. Its strength, durability, resistance to wear, make it practically maintenance free. Requires no painting. Big 4' x 8' boards . . . readily sawed or scored . . . drilled and nailed.

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Interior walls, partitions, ceilings, barriers, floors, etc., are often subjected to fire, temperature, moisture and corrosion hazards under which both organic and metallic materials would be unsuitable. Stonewall Board provides effective protection against such hazards. Vent ducts, furnace hoods, fire and heat barriers, breechings, shower stalls, fan rooms, humidifiers, bench tops are some of the many other applications of Stonewall Board.

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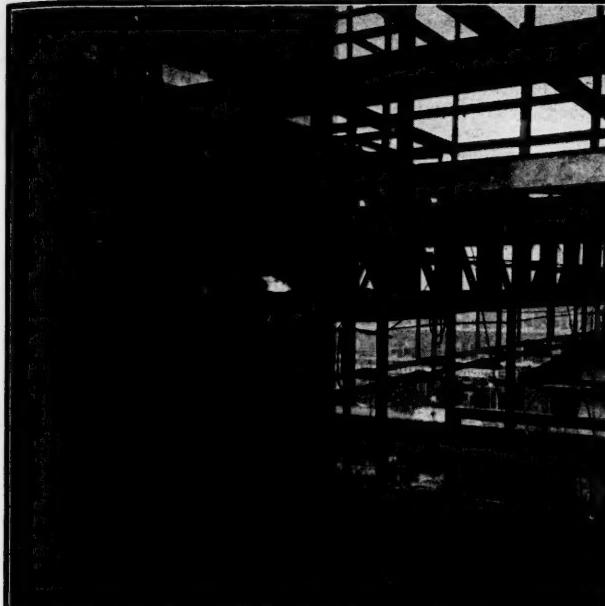
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Machine Tools from Old Truck Gears and Steel Shapes

ONE of the ways in which American inventiveness and ingenuity are answering General Eisenhower's call for more munitions is illustrated by a Texas metal fabricator who has utilized double reduction gear sets salvaged from old trucks, combining them with a few odds and ends of structural steel members to produce strong, all-welded threading machines for bomb manufacture.

Reports of this unusual machine tool design were received by the Lincoln Electric Co., Cleveland, Ohio, whose arc welding equipment and supplies used in the construction were furnished through their Fort Worth, Texas, distributor, Big Three Welding Equipment Company.

The machine tools units which are now in use in four important Texas war plants, were designed and built by Marvin A. Blake and Warren B. Mims, co-owners of Machine Tool Projects Co., of Dallas, who report that the installations now in service have already produced over 5,000,000 complete internal threads for parts used in various types of bombs that are so sorely needed on our fighting fronts.

The threading machines, like many other structures designed for welding, are typical examples of simplicity, light weight and efficient operation. A battery of the gear sets, many of which were reclaimed from 2½-ton trucks, is shown in Fig. 1, mounted on sturdy bases made of

8-inch H beams cut and arc welded into solid vibrationless structures. The coolant reservoir, also shown in this view, is fabricated of a length of 8-inch H beam with sides and ends enclosed by welding in sheet steel pieces that had been cut to fit.

A completed threading machine, minus the air-operated chucking device with which each is equipped, is shown in Fig. 2. Grease retainer containers were welded on each end of the gear case. The coolant pan, seen at the right, is formed of sheet steel corner welded at the joints to provide leak-proof construction.

The various types of joints such as butt and fillet joints employed in the design were welded in flat position wherever possible, ½-inch and 5/32-inch shielded arc electrodes of American Welding Society specification E6010 being used for all multi-pass welds, with E6012 electrodes used for single pass joints.

Power is furnished by a two-horsepower electric motor, the speed of the spindle governed by the revolutions per minute of the motor and the pulley hook-up. Normal gear ratio of the truck gear sets is used for most threading operations.

According to the reports, the machines will perform a number of difficult operations such as threading through holes, bottom holes and threading any standard number of threads per inch. It further states that comparable machine units of this type, if available, would have cost up to five times as much.

1945 Shipbuilding Allocations

Construction allocations for 109 new ships to be built in southern shipyards have been announced by Emory S. Land, Chairman, U. S. Maritime Commission. The allocations call for delivery of the major part of the ships during 1945. Admiral Land stated the vessels were authorized for urgent military needs, and expressed confidence the yards would come through for victory.

Breakdown of the allocations shows distribution of ships to yards: Tankers—Alabama Dry Dock and Shipbuilding Co., Mobile, Ala., 12; Welding Shipyards, Inc., Norfolk, Va., 2; C-2 Type—North Carolina Shipbuilding Co., Wilmington, 15; Gulf Shipbuilding Corp., Chickasaw, Ala., 2; Z-EC (Special Military Type)—J. A. Jones Construction Co., Panama City, Fla., 12.

Military Type—Bethlehem-Fairfield Shipyard, Inc., Baltimore, Md., 20; C-3 Type—Ingalls Shipbuilding Corp., Birmingham, Ala., 4; Bethlehem-Sparrows Point Shipyard, Inc., Sparrows Point, Md., 2; CI-M-AVI Type—J. A. Jones Construction Co., Inc., Brunswick, Ga., 14; Southeastern Shipbuilding Corp., Savannah, Ga., 14, and Pennsylvania Shipyards, Inc., Beaumont, Texas, 12.

Revenue Freight, 1944

Loading of revenue freight for 1944 totaled 43,499,063 cars, an increase of 1,082,303 over the previous year.

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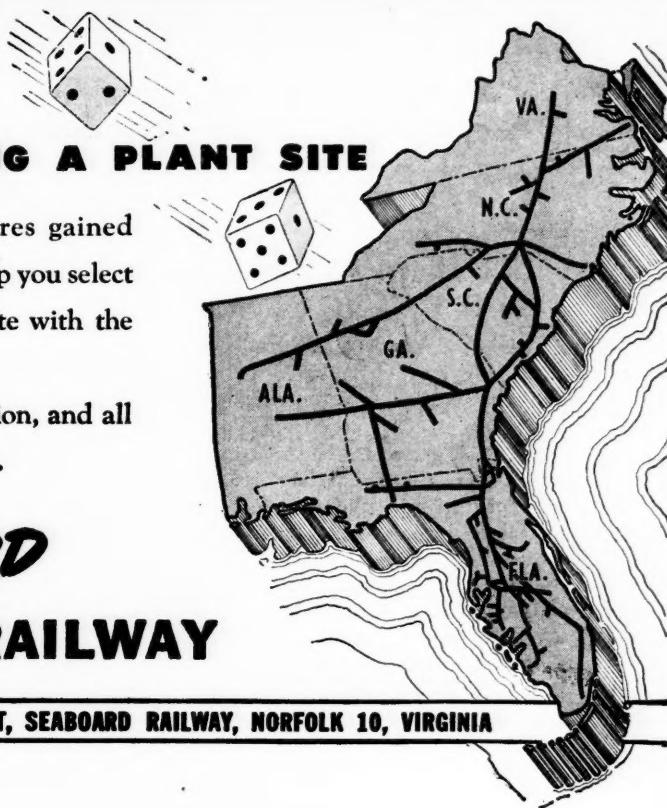
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CAPITAL FOR EXPANSION

Life-Blood of Postwar Business

It's almost axiomatic that adequate capital is the life-blood of expanding business. It opens many doors to progress, and acts as a financial shock absorber against the unforeseeable future. The opportunities ahead—broad, open markets to be entered, modern government-owned plants and machinery available for purchase—exist for the corporation *in position* to expand.

As investment bankers, it has been our privilege to assist wide-awake management in preparing the financial foundation for such expansion *now*. New financing takes careful planning—and time. Our facilities and experience have been utilized in underwriting new issues and setting them up in line with requirements of the Securities Acts. Establishing price, correct timing and sound distribution are other phases in which our experience and facilities are of value. •

If you are "thinking postwar", *this* may be the time to consult with one of our partners about similar service in obtaining new capital for your firm.

During 1944 this firm has raised new capital through public offerings for the following corporations:

ATLAS PLYWOOD CORPORATION—noted maker of plywood packing cases.

DIANA STORES CORPORATION—a chain of 26 women's apparel stores in the South Atlantic States.

NATIONAL CONTAINER CORPORATION—a leading maker of kraft pulp, kraft paperboard, corrugated and solid fibre shipping containers.

THE DRACKETT COMPANY—manufacturer of chemicals, including the household cleaning products "Drano" and "Windex;" also soybean oil and oil meal.

BUFFALO BOLT COMPANY—89 year old manufacturer of nuts, bolts and rivets.

ALLEN B. DUMONT LABORATORIES, INC.—prominent in the field of television, manufacturer of electronic devices and radar equipment.

SOLAR MANUFACTURING CORPORATION—maker of electrical appliances for industrial, radio and household fields.

FRANKLIN STORES CORPORATION—a chain of 52 women's apparel stores in Texas, Louisiana, Mississippi, Oklahoma, Arkansas and Minnesota.

Coast Line Buys New Rail

The Atlantic Coast Line Railroad Company's recent order for \$2,000,000 worth of new and heavier rail for replacements on their Richmond-Jacksonville division is evidence of the company's faith in the future of the South and its desire to render service with safety.

Benefits of the purchase will be many. Steel mills handling the order can maintain high levels of employment, while coal and iron miners are assured more work. Special roadway gangs will be needed to lay the new rails and the heavier ribbons will require special re-ballasting in many instances.

Virginia Minerals Pass \$90 Million

During 1943 Virginia mines yielded minerals totaling \$90,068,000 in value, largest in the history of the Old Dominion. Raw minerals contributed the bulk of the total, aggregating \$82,068,000, while an additional \$8 million was derived from processed rocks and minerals used in the manufacture of pigments, rock wool, ferro-alloys, ground feldspar and coke.

Non-metallic minerals valued at \$72,484,000 accounted for most of last year's production, with coal at the mines representing \$56 million of this total, a jump of \$30 million since 1940.

Mississippi Company to Double Wagon Output

The M-R-S Manufacturing Company, Jackson, Miss., producers of Mississippi Wagon hauling units, plans to increase its production in 1945, according to recent announcement by L. R. Simmons, general manager.

"Our present plans call for double production of Mississippi Wagons during the coming year as compared to our 1944 production," Mr. Simmons said. "This increase in output is being made due to increased demands for this type of hauling equipment.

"During the past year, we have sold fleets of Mississippi Wagons throughout the United States and in foreign countries. Reception of this new type of hauling equipment has been most gratifying...."

The Mississippi Wagon is designed to haul dirt, gravel, topsoil, coal, sand, limestone and other general hauling material. Distribution during the past year has gone to levee contractors, road contractors, counties and municipalities and foreign countries.

Asheville Firm Wins "E"

Dave Steel Co., Inc., of Asheville, N. C., was recently awarded the coveted Army-Navy "E" pennant for excellence in war production, the first Asheville firm to be so honored. Early in the war the firm fabricated steel for war plants, later producing parts for cargo vessels and sub-assemblies for destroyer escorts. During 1944 principal production has been large sections of LSMs for the navy. Founded in 1929 with two employees, activities of the Dave organization now extend from the Great Lakes to the Gulf of Mexico.

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In *Fulton* WATERPROOF COTTON AND BURLAP PAPER LINED BAGS

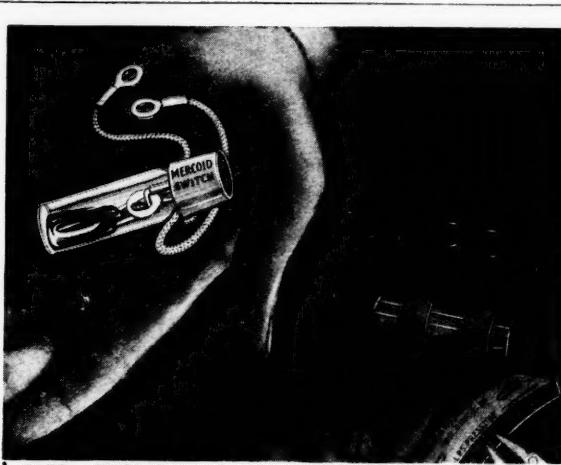
In these times bag production is war production. Our plants have supplied millions of sand bags as well as various other items for use in combat areas. Behind the lines, supplies of food and other material are transported thousands of miles in bags specially designed to protect contents against hazards of rough handling, moisture and insects. Back here at home bags must move a long list of essential commodities ranging from small machine parts, through dozens of items of food, feed and produce to the hygroscopic chemicals requiring special waterproof packages. Many Fulton Waterproof Paper Lined Bags are replacing containers made of critical materials—metal drums, wooden boxes and barrels.

The output of our plants will continue to be devoted to these essential requirements until Victory itself is "in the bag."

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All Mercoid Controls are equipped exclusively with hermetically sealed mercury switches of special design and critically selected materials. Mercoid mercury switches are known the world over for their dependable service. They are not affected by dust, dirt or corrosion; nor are they subject to open arcing with its attendant consequences of pitting, sticking or oxidized contact surfaces, all of which, are likely to interfere with normal switch operation. That is why among other things, Mercoid Controls on the whole give you assurance of better control performance and longer control life—a distinct and unfailing advantage—the reason why they are also the choice of America's leading engineers for many important wartime industrial applications.

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Southern Railway Plans Rebuilding at Charleston

The Southern Railway announced that it has completed plans to restore and modernize its Charleston, S. C., Cooper River banana handling facilities which were destroyed by fire on October 6, 1944. The early consummation of these plans, the statement added, is dependent upon the approval of the War Production Board and upon the success of the railroad in obtaining the necessary materials and supplies for the work.

The proposed facilities will restore to the Port of Charleston the large banana traffic which it enjoyed for many years before the recent destruction of the Southern's Pier No. 2 over which this traffic had been handled. In addition, it is expected that the new facilities will bring an increased volume of this traffic through the Port of Charleston.

The new pier, designed especially for the handling of bananas, will be rebuilt on the site of the pier which was burned and, so far as possible, will utilize the substructure of the old pier. In addition, a large classification shed, a two-story brick office and utilities building, a brick oil house, three covered island loading platforms and parallel loading tracks with a capacity of 36 cars will be constructed. Modern, mechanically-operated unloading and handling machinery will be installed on the pier by the United Fruit Company.

When the facilities are completed, bananas will be handled from ship hold to the pier by mechanical conveyors. On the pier they will be transferred to three conveyors which will carry them to a classification shed where they will be graded and tagged. From the classification shed, the bananas will then be moved by conveyor to and along the island platforms to freight cars. Fruit not suitable for rail shipment will be moved from the classification shed by another conveyor running to a platform for distribution by truck.

These improvements will greatly facilitate the unloading of bananas from ships and reloading into freight cars. It is estimated that the handling time at the pier will be reduced by at least 50 per cent.

The rebuilt pier itself will be 440 feet long and 54 feet wide. The classification shed which adjoins the pier will be 96 feet long and 45 feet wide. The shed which houses the conveyors on the pier proper will be 380 feet long by 21 feet wide. The sheds will be of timber construction with corrugated asbestos siding.

Charleston's port is the ocean terminal of the Southern's Charleston division, which connects with the road's Charlotte division at Charlotte, Spartanburg and Greenville, thus providing facilities for the prompt movement of bananas to all points in the East and Central West reached by the lines of the Southern and its connections.

Mason Appointed Charlotte T. F. A. for Virginian Railway

R. B. Hancock, general agent of the Virginian Railway Co., has announced the appointment of A. T. Mason as traveling freight agent in the company's Charlotte, N. C., agency.

Rails of West Put to Test

A recent release of the Office of Defense Transportation concludes, "The shift of military activity from Europe to the Pacific theater will add to the passenger problems of the railroads. The movement of troops and war material westward in great volume is requiring new routings of traffic and many additions to trackage and various facilities. There are long stretches of single track line in the West, which must now haul loads comparable to those that have been carried on the network of double or four-track railroads serving the many ports on the eastern seaboard. The western roads are now facing their hardest wartime problem."

Along with the troubles and problems enumerated, the rail carriers of the West will have to contend with the persecutions of the Attorney General of the United States. The manner in which the railroads have handled the unprecedented loads of war gives ample assurance the western lines will accomplish their Herculean task in spite of the Attorney General.

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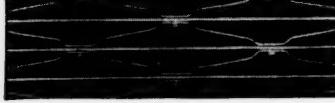
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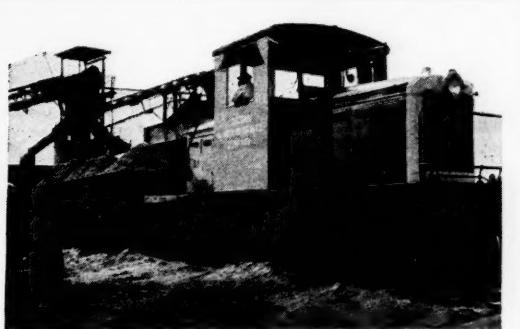


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THE RESULT OF LONG ACCUMULATED EXPERIENCE, PLUS QUALITY STANDARDS RIGIDLY MAINTAINED

Fig. 2129

Fig. 2125

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The new glue, waterproof and non-corrosive, is nearly 50 per cent stronger than any adhesive yet produced. It has a tensile strength of over 5,000 pounds per square inch, compared with a maximum of 3,800 pounds per square inch for straight phenolic resin, and a top of 3,000 pounds per square inch for the best animal glues.

Demands of war will keep this new by-product from the markets until the coming of peace when it will find unlimited use in building construction, parts for aircraft, furniture manufacturing, marine construction and countless other applications where high strength and durability are essential.

Southern Shipbuilding in 1944

With delivery of 52 ships during December, merchant shipyards of the South have turned out 709 vessels of various types during 1944, for the U. S. Maritime Commission.

Fort Worth Seeks Mexican Business

Looking toward closer business relations with Mexico at the close of the war, the Fort Worth, Texas, Chamber of Commerce has published an attractive Mexican folder which is being distributed in select Mexican channels. The twelve page booklet, written in Spanish and printed in three colors, was arranged and compiled by the Mexican Affairs Committee, in cooperation with the chamber's publicity staff.

Possibilities of closer business ties between Fort Worth and Mexico receive emphasis, with especial notice given transportation facilities—highway, bus, air and rail—between Mexico and the Texas City. Also, the booklet carries a brief resume of Fort Worth—its history, industries, civic life and Mexican population.

New Eno Editorial Director

Roscoe Ellard, magazine writer and Columbia University professor, has taken over the post of editorial director of the Eno Foundation for Highway Traffic Control, a research affiliate of Yale University.

William Phelps Eno, founder and chairman of the board, announced the appointment at the foundation building here today. Mr. Eno, traffic pioneer who furnished the first traffic code officially adopted by New York City on October 30, 1903—later used in London and Paris—and who originated rotary traffic and one-way streets, has, since 1921, endowed the Foundation with approximately \$2,000,000. It is a study center for traffic control throughout the world.

"Our activities as a clearing-house for highway traffic methods will be accelerated," Mr. Eno announced. "Wartime deterioration of motor vehicles and roads, accidents that are mounting even now, and increased speed when restrictions lift, make the traffic situation, at home and abroad, a vital post-war problem and an immediate issue. Speed, it can be scientifically demonstrated, is a factor in every accident. Traffic planning, enforcement and road design can save immense amounts of life, money and productive time."

Mr. Ellard will continue, Mr. Eno said, as staff writer for Editor and Publisher magazine and as director of the graduate work in Reporting and Newspaper Production at Columbia. He was formerly with the Chicago Daily News and the Milwaukee Telegram and was a correspondent for the Associated Press. For 11 years he was editorial director of a daily newspaper in Missouri. He held a professorship at the Missouri School of Journalism, served as acting Dean there, and was head of the School of Journalism at Washington and Lee University. He joined the faculty of Columbia University in 1940. He is now directing a research project in public opinion at Washington, D. C.

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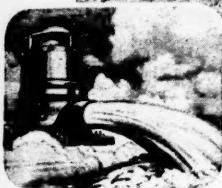
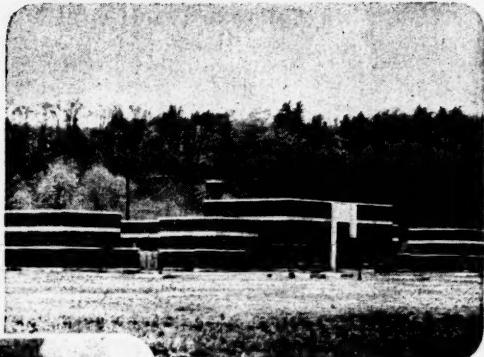
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FOR



For Schenectady

45,000,000 Gallons Daily
From 9 Layne Units

Late in 1942, Schenectady faced a serious water crisis. New war industries and increased population demanded more and more water. The old system was over-burdened. Reserve was diminishing a million gallons daily.

Layne was given a contract that covered wells, pumps, electrical equipment and other essential apparatus. Layne New York Company put full crews on the job and in record time completed two wells in time to prevent a crisis. Seven other wells and pumps were soon ready and in service, giving Schenectady 45,000,000 gallons of fine water daily—and at a saving of \$10,000 a year on operating cost.

Though constructed at extraordinary speed, operation was perfect and efficiency up to the guarantee. No other firm in America,—or perhaps in the entire world—could have matched Layne's overall performance.

Layne Wells and Pumps are the world's finest in quality, efficiency, design and long life. For late literature, address Layne & Bowler, Inc. General Offices, Memphis 8, Tennessee.

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Manufacturers of Miteo Open Steel Flooring, Miteo Shur-Site Treads and Miteo Armorgrids.

ARC Welded Boom Features Retractable Wheel

By

STEPHEN E. STAWIARSKI
Holyoke, Mass.

(Former S/Sgt. U. S. Army Air Corps)

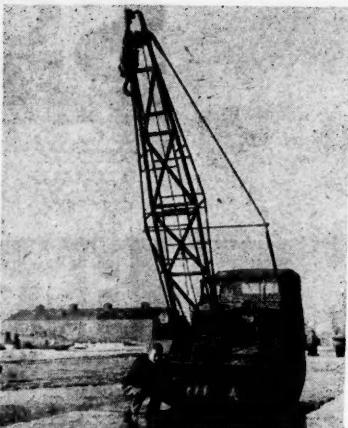
During the four years I served in the United States Army, one of the most important arc welding jobs that was encountered was this boom that I designed and constructed for lifting engines, pro-



Retractable Wheel Assembly

peller assemblies, tail ends of planes, in fact, all general hoisting operations.

The boom was constructed of one and two inch aircraft tubing with a one-quarter inch wall thickness and was completely arc welded. The base is slotted and reinforced with one inch bolts holding it to two uprights made of armor plat-



Stawiarski Boom

ing set right in back of the bumper of the tractor. The boom was designed for lifting ten tons but when attached to the five ton tractor for portability, it was necessary for us to design the wheel assembly which acts as a fulcrum and holds the tractor on an even keel when hauling excessive loads around the air field.

The hook on the boom was made of six-sided bar stock and tempered just enough to bend at severe strain, and channel iron and sheet steel were used for the sheave, reinforced with bosses in each section to

Callaway Plan Gets Under Way

The "Callaway Plan" (*Manufacturers Record*, November, 1944) has hurdled its first obstacle, the raising of \$700,000 to acquire average or sub-marginal lands for purposes of soil rebuilding and conservation. Says the Atlanta Constitution, "The success of this first phase (raising the money) is an encouraging indication of the average citizen's realization of the importance of agriculture to Georgia's well-being." The goal was reached a full month ahead of schedule. Much work lies ahead, but there is every indication the plan will prove highly successful.

prevent buckling. The cable holding the boom is $\frac{3}{4}$ " flexible cable with a snapping point of 23.6 tons. It was spliced and placed right over the "ears" at the top of the boom, which are the reinforcements for the sheave.

The supporting wheel assembly was designed to be retractable so that the tractor could move the weight on the boom and deposit it with the least effort, saving time which is so valuable to Army Air Force Units. In the down position there is a clearance of only $\frac{3}{4}$ " above the ground, very little tilt being allowed. The wheel assembly is raised when the boom is idle and if the tractor is out servicing planes it is not in the way when tractor is traveling at a fast speed over rough ground.

THOMAS TRUCK of Keokuk



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4 WHEEL TRUCKS

2 WHEEL TRUCKS

CASTERS

RUBBER WHEELS

Safety One Man

BARREL TRUCK

NO. 90

- Trucker never touches barrel.
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Safer, faster, easier way for one man to handle barrels, drums, kegs up to 1000 lbs. Chime hook engages rim and cast steel prongs slide under drum instant truck pulls truck back. That's all there is to it! Rubber tired wheels.

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FLEX V
TRADE-MARK

A new Fastener for A and B V-belts

Here is a new fastener, the Flex V, for the smaller sizes of V-belts that is going to establish the same outstanding performance record as the Alligator V-belt fastener has already established for the larger sizes of V-belts.

This new Flex V fastener is made in two sizes for A and B section V-belts. It is simple in design, easy to apply and the separable hinge joint makes for quick replacement of V-belts without dismantling shafting or machinery. No metal touches the pulley so Flex V fastened belts can be run on a V-flat drive.

Folder No. V-12 gives complete details on this new Flex V fastener with list prices, special tools and application information. Your request will bring a copy.

Order from your supply house

FLEXIBLE STEEL LACING CO.
4690 LEXINGTON ST., CHICAGO 44, ILLINOIS

Also sole manufacturers of Alligator Steel Lacing for flat transmission belts. Alligator V-belt Fasteners for V-belts and Flexco HD Belt Fasteners and Rip Plates for fastening and repairing conveyor belts.



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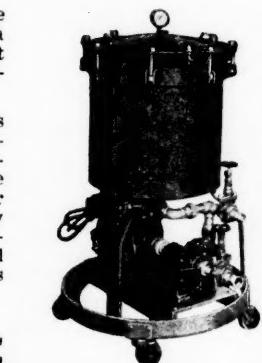
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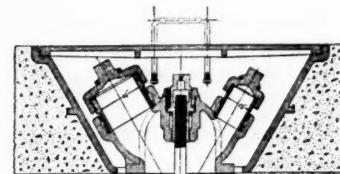


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There is need now of "facing the problems of peace in advance of victory." We are glad to cooperate by furnishing data and information so that you may incorporate M&H Valves and Hydrants in your specifications for postwar factory changes and improvements. Blueprint now and be ready.



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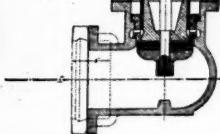
FLUSH

HYDRANT

Used in places where standard hydrant might interfere with traffic or industrial operations.



Check Valve



M & H GATE VALVES are cast iron body, bronze mounted, with double-disc parallel seat or solid wedge top, non-rising stem or outside screw yoke. They come either with flanged or screwed connections. Valves for fire protection lines are marked "UA-FM" to denote approval of both the Underwriters and the Factory mutuals.

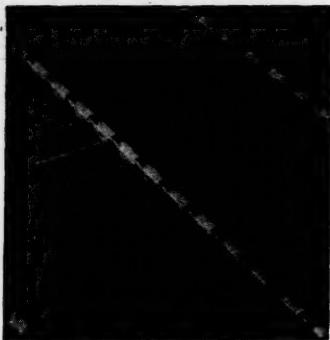
M & H FIRE HYDRANTS are revolving head, dry top, bronze mounted. They also are approved by "UA-FM". Entire main valve assembly is removable through barrel without digging. Special Traffic Model is fitted with breakable bolts and stem coupling, designed to break at ground line under impact. Repairs are made simply by renewing bolts and coupling, without shutting off the water.

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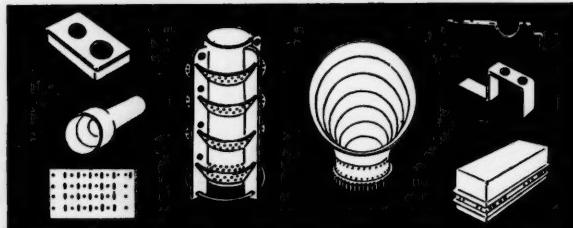
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Expert engineering plus careful research assures a capable solution of your problem.



We approach each problem in a manner bringing to bear upon it the experience of years of operation. Equipment and personnel enable a refinement of detail for which the products of our effort are justly noted. We are confident that entire satisfaction would mark our efforts in your behalf.

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American Steel Dredge Building Engineer Units

A new 12-inch hydraulic dredge being produced by the American Steel Dredge Co., Inc., Fort Wayne, Ind., for the U. S. Army Engineer Corps, has been revealed by Walter W. Walb, general manager of the company, who said that this firm is building a number of these Diesel-powered units for the Engineers.

The new dredges are completely integrated, of compact design and are fully equipped to operate in isolated locations for long periods. They require no supply service except for fuel oil, lube oil and sustenance for personnel. They are designed to handle sand, clay and silt to a depth of 16 feet and deliver the material through a maximum of 1000 feet of discharge line at water level, or 500 feet of discharge line at 30-foot elevation.

The general specifications call for a main dredging pump with a 14-inch suction and 12-inch discharge pipe, powered by an eight-cylinder, 320 H.P. Diesel engine; a main power plant of an 85 kilowatt Diesel electric generator set, and an auxiliary Diesel power plant of 6 kilowatts.

The 104-foot by 29 feet by 6 inches prefabricated steel hull is an adaptation of the K-D bolted sectional barge that the company has been producing for the Army Transportation Corps for more than a year. The bolted steel hull enables shipment of the complete dredge, on standard railroad cars and as hold cargo to overseas destinations. Even for this large dredge no deck space is needed for its transportation. No fabrication is necessary at the site of erection.

The dredge has a 36-foot digging ladder provided with an adequate margin of overload capacity, and fitted with interchangeable cutter heads to meet the changing character of material encountered on different projects. The unit is equipped with a five-drum hoist which enables extremely high rope pull at low speeds due to special compound gearing. Cone friction clutches are used and a drum switch controlling the hoist makes its operation extremely flexible.

The American Steel Dredge Company has been making this general type unit for more than 40 years in sizes up to 20 inches and designed for all-electric or steam power. Its equipment is in use on dredging operations all over the world: shore fills on lakes and rivers, drainage projects, channel and canal improvements, cleaning and enlarging reservoirs, building dams, embankments, levees, hydraulic mining and recovery operations.

"The Palletized Load"

A new philosophy of simplified packaging which effects tremendous economies in shipping space and handling costs is discussed in Robert Gair Company's new illustrated 28-page booklet, "The Palletized Load," by J. D. Malcolmson, Technical Director of Robert Gair Company, Inc. It has been cleared through the U. S. Navy, whose experiences with palletizing provide valuable information for shippers.

The use of pallets is not new, but their full possibilities were not realized in practice until the Navy carried the idea to its logical conclusion. Faced with the necessity of transporting millions of various-size items, the Navy developed a simple, time-saving, labor-saving and space-saving formula for expediting the handling of the colossal volume of merchandise and supplies which passed through its depots in a never-ending stream. The basic theory is design of shipping containers to fit a freight car instead of to hold a certain amount of merchandise.

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Explosion Proof Motor

By Telechron

A new explosion proof electric motor has been developed by the Warren Telechron Co., Ashland, Mass., according to an announcement by Roy W. Johnson, vice president.

This motor is totally enclosed in bronze casting with removable screw cover and adapted for explosion proof conduit mounting. It can be supplied in various shaft speeds, voltages, and frequency. Developed primarily for use in connection with automatic controls used in industrial processes where atmospheres containing ethyl ether vapor, gasoline, petroleum, naphtha, alcohols, acetone, lacquer solvent vapors and natural gas are found, the motors have already been used in some of the large war plants producing chemicals, synthetic rubber, high-octane gas, and ammunition. The motor carries Underwriters' approval label, Class 1, Grade C and D, for hazardous locations.

International Harvester Appoints

J. F. Sims Zone Manager

The Industrial Power Division of the International Harvester Co. announces appointment of J. F. Sims as zone manager for Zones 8 and 9, with headquarters at the International Harvester branch at Richmond, Va. Mr. Sims will work with the following International industrial power distributors: Paving Supply & Equipment Co., Inc., Washington, D. C. and Baltimore, Md.; Rish Equipment Co., Charleston and Clarksburg, W. Va.; Richmond and Roanoke, Va.; Hampton Roads Tractor & Equipment Co., Norfolk, Va.; Industrial Equipment Co., Sumter, S. Car.; and North Carolina Equipment Co., Raleigh and Charlotte, N. Car.

Mr. Sims has had many years' experience in the construction machinery industry throughout the South, Middlewest, and East. He spent several years on construction equipment during the reconstruction of the Mississippi River levee system following the floods of 1927. He joined the Harvester Company at Atlanta, Georgia, in 1934. In January, 1942, he was assigned to the Washington office of the Harvester Company, where he has been handling industrial power equipment with the armed services and the War Production Board.

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Whether to fashion springs or wire forms or any of the innumerable uses of Music Wire, you will find Johnson's XLO Music Wire a readily adaptable product. Note spring on each end of coil. Wire sizes .003" to .200" diameter.

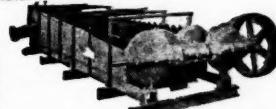
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Single and double roll and jaw crushers, hammer mills, super dry pans, steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists.

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Complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any materials.



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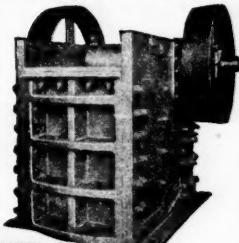
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150 to 200 tons Per
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Shovel Rock to 5"
and 6" minus.

"White Glove" Fuel

A new product, to be known as "white glove" fuel because of its cleanliness, will help to alleviate the critical fuel shortage as soon as a plant for its manufacture is erected at Philadelphia, Pa. The project will be financed by the Defense Plant Corporation, and will be built and operated by the Blaw-Knox Company of Pittsburgh. Land, building and equipment will cost \$400,000.

The new fuel will be made from anthracite and bituminous fines held together by an asphalt binder. It will be processed in the form of 3-inch cubes. Each will weigh a trifle more than a pound. A paper-wrapped package of six cubes will weigh 7 1/2 pounds.

The plant will have an annual capacity of 150,000 tons, using 120,000 tons of anthracite in the process. It was suggested by the Solid Fuels Administration as part of its program to meet the increasing demands for home-heating fuel, and to lessen the discomfort and suffering that resulted when household consumers in some areas were unable to purchase sufficient coal to meet their needs.

Blaw-Knox will operate the plant for the time being. It is the intention of this company to manufacture processing equipment needed in the construction of similar plants elsewhere. Blaw-Knox is a Pittsburgh engineering and steel fabricating concern manufacturing a wide variety of nationally well-known products. It has had a major role in the design, construction and equipment of the nation's synthetic rubber industry.

The new scientifically prepared fuel can be burned efficiently without any changes in furnaces or stoves, and from extensive tests it is found to meet existing smoke abatement regulations.

Gypsum Manufacturers Prepare To Step Up Production

Manufacturers of fireproof gypsum sheathing are preparing to step up production to meet demand. Gypsum sheathing provides fire protection, as well as weather resistance and long life. Manufactured to unvarying standards in mass lots, the sheathing is produced in large panels which can be applied to the wall studs with little or no cutting, eliminating waste and saving one-third in erection time. Over it can be placed wood siding, brick veneer, shingles, stucco or almost any other

Ickes Says Industry Must Rely On Stockpiles for Coal

Industries using coal have been notified by Solid Fuels Administrator Ickes that they will have to turn to their stockpiles for a substantial part of their fuel for the remainder of the winter. This will be the only way of getting through the winter without causing distress to the civilian population or reducing industrial production, said the Administrator.

Preliminary figures indicate December production will fall 11.5 million tons behind consumption, largest gap for any month since the war began. Stepped-up war production and severe weather conditions may make the gap even wider.

Many plants will have to dig deeply into storage piles, while every consumer will have to take firm conservation steps and utilize whatever fuel is available to him.

Mr. Ickes' statement made no reference to strikes or other labor disturbances as being partially responsible for the dangerous bituminous situation.

type of exterior finish. A core of processed gypsum between two sheets of weather-resistant paper, this sheathing is easy to handle and easy to erect, according to the Gypsum Association. Already in mass production, it is readily available and will be able to supply the urgent need for sheathing.

A.C. Booster Pumps

A new line of single-stage, double-suction fire and booster pumps designed for efficient, low-cost fire protection have been announced by Allis-Chalmers Manufacturing Co., Milwaukee 1, Wisc., in a bulletin (B6336) recently released. The pumps are approved for heads

ranging from 60 pounds per square inch to 108 pounds per square inch at capacities ranging from 500 gpm to 1500 gpm.

The pump units, approved by Underwriters Laboratories, include pump with brass plugs, umbrella cock, increasers and capacity plate mounted on base plate, and direct-connected to a driver by means of a flexible coupling. According to plant requirements, the units also can be completed with a splash partition plate.

To make the unit suitable for its purpose, fire fittings are available for 500, 750 and 1,000 gallon ratings. These include hose valves, discharge base elbow, hose manifold, relief valves, discharge cone, suction and discharge gauges, vent piping and, for the 1,000 gallon capacity pump, a discharge cross.

The new bulletin, B6336, may be obtained by request from Allis-Chalmers Mfg. Co., Milwaukee 1, Wisc.

Mackey Heads Westinghouse Office at Dallas

Appointment of C. M. Mackey as manager of the Southwest District, with offices in Dallas, has been announced by D. M. Salisbury, general manager of the Westinghouse Electric Supply Co. Mr. Mackey was transferred from Houston, where he was branch manager for Westinghouse during the past several years.

Joining Westinghouse in 1917 as a member of the graduate student course, he was in the General Engineering Department in East Pittsburgh, Pa., for two years, and then became a salesman for Westinghouse products in Denver until 1921. From this position he was named manager of the Electrical Department of Mine & Smelter Supply Co., a Westinghouse agent-jobber, in El Paso, Texas.

In 1931 Mr. Mackey became manager of the Tulsa office of the Westinghouse Electric Supply Co. After remaining there for two years he went to Oklahoma City in the same capacity. He was transferred to Houston in 1938. Mr. Mackey was born near Dallas on a ranch settled by his great-grandfather over a hundred years ago, when Texas was an independent republic. He was educated at the University of Oklahoma, where he took his B. A. and B. S. degrees, and also a degree in electrical engineering.

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MEMPHIS FURNITURE MANUFACTURING CO.

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MANUFACTURERS OF LOW PRICED FURNITURE

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ESTABLISHED 1892

MEMPHIS, TENNESSEE



Covering Forty Acres, Served by 11 Railroads, Established 30 Years

FOREST PRODUCTS CHEMICAL COMPANY

MEMPHIS, TENNESSEE

Manufacturers of

Methanol (Wood Alcohol), Acetic Acid,
Charcoal, Wood Oils and Pitch

BRATTON AND HOLCOMB

*Selling Agents for
Veneer Products*

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MEMPHIS 1, TENNESSEE

MEMPHIS VENEER, INC.

*Specializing in
Rotary Cut Veneer*

MILL & OFFICE: 83 WATER WORKS AVE., MEMPHIS
P. O. BOX 43

SOUTHERN LAMINATING CO.

*Manufacturers of
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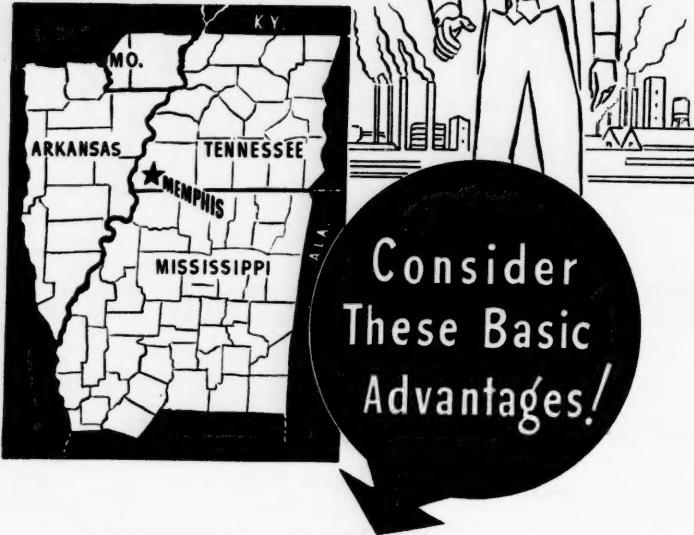
1601 CLANCY

MEMPHIS, TENNESSEE

P. O. BOX 115

MEMPHIS

Invites Industry



Memphis Offers:

1. Ideal Climate and Living Conditions.
2. Cooperative Skilled and Unskilled Labor.
3. Advantageous Location with Large Trade Area.
4. Good Government with Low Taxes.
5. Abundant Low-Cost Power and Natural Gas.
6. Fine Water Supply. Industrially Suitable.
7. Excellent Transportation — Rail, River, Highway and Air.
8. Proximity of Raw Materials.

Inquiries from Banks and Businesses Interested in Memphis Are Cordially Invited.

UNION PLANTERS
NATIONAL BANK & TRUST CO.
MEMPHIS, TENN.

Capital, Surplus and Undivided Profits Over Eleven Million Dollars

★ Member Federal Deposit Insurance Corporation ★

Catalog Describes Counterbore

A 20-page catalog that illustrates and includes specifications of a new counterbore and special high speed steel cutting tools has been issued by the Moreland Tool Co., 16935 W. McNichols Road, Detroit, Mich. The eccentric principle is utilized in the design to completely equalize the torque load on the holder and the mating driving member of the cutter ... both shank of cutter and corresponding hole in the holder being round in shape and eccentric in location only. Concentricity of the assembled unit is held to the closest precision tolerances by means of a "stick taper." The angular notch is so positioned, as to assure a full contact of the driving members from the start, which also functions as a mechanical check against careless assembly of holder and cutter. The pilot has no other function than as a guide.

Lead Uses Restricted

War Production Board has announced that most civilian uses for lead will be restricted to the annual rate of 60 per cent of the 1944 level. The restriction came through a complete revision of Order M-38. Increased munitions requirements, lessened stockpiles and manpower shortage were principal factors necessitating the new order.

Combustion Control System

A new thermostatically-regulated combustion control system for hand-fired heating plants designed to save fuel and increase heating efficiency and convenience, is offered by the Perfex Corp., 500 W. Oklahoma Ave., Milwaukee 7, Wisconsin. Incorporated in this system are the new Barometric Draft Control with an attached Thermo-Draulic Damper Operator, the Magic Dial Thermostat, and a Limit Control. This new combustion control system gets the maximum value out of all grades of hand-fired fuel because it adjusts the rate of combustion to heating needs and furnace capacity all the way through the burning process.

Bruning BW-Copyflex Printer

A machine recently announced by the Charles Bruning Co., of Chicago, known as the BW-Copyflex Model 2 continuous printer, provides complete reproduction facilities for any type of industry or business. The BW-Copyflex continuous printer exposes, with the use of Copyflex materials, tracings, line drawings, specifications, Van Dyke negatives, blue prints, etc. Original material with copy on both sides can be reproduced on either side or both sides. Copyflex Prints are developed in trays and dried in a simple drier.

Automatic Fly Control

Automatic fly control has been developed by Detien Corp., of New York. The result is accomplished by the use of electric fly screens which electrocute the flies day and night under any moisture or weather conditions. The fly screen panel consists of a grid of horizontal metal bars which are fastened into an insulated metal and wood frame 1 1/4 inches thick. The bars are spaced 9/32 inch apart. The unit is energized by a specially constructed transformer and is designed for installation in door and window openings where flies usually congregate. The company recommends the screens for installation by dairy farmers and livestock breeders, dairies, creameries and cheese plants, meat packers and food factories, poultry farmers, hospitals and institutions, hotels and restaurants, bakeries and food stores and military and naval stations.

Crusher Shear Plate Improvement

Replaceable emergency shear plates are a safety improvement against roll breakage on aggregate crushers made by the Iowa Manufacturing Co., Cedar Rapids, Iowa.

Under ideal working conditions, heavy helical springs of chrome vanadium steel maintain proper tension on the floating roll and keep the opening for material constant. When uncrushable foreign material is introduced, the springs protect the roll by relieving the undue stress and prevent breakage.

If exceptionally large uncrushable material passes into the rolls, shear plates at the butt of the springs snap and free the springs completely. Each shear plate consists of 11-gauge sheet iron, and is located in the slot of the adjustable plate that holds the spring in position as shown in the drawing.

Any large piece of uncrushable material, such as tramp iron, would cause the nut slotted for and holding the shear plate, on the end of the adjustable screw bolt, to shear the plate and allow the unrestrained bolt to pass through the spring and instantly release all tension on the floating roll.

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**EXCLUSIVE MEMPHIS WHOLESALERS OF THE NATIONALLY FAMOUS
ARMSTRONG'S FLOOR COVERINGS**

"Every dealer will want this line," we said when we ordered our first carload of Armstrong products (way back in 1914). Steadily the trend has been "more and more Armstrong," with the result that we have featured this line exclusively in hard surface floor covering. Today, as from the beginning 30 years ago, hundreds of independent retail dealers of the South are supplied overnight from our Memphis stock.

Wm R. Moore
DRY GOODS COMPANY
MEMPHIS

The South's Largest Wholesale House — In Our 85th Year.

**THE
CHATTANOOGA
STAMPING & ENAMELING
COMPANY**

Manufacturers Road

**CHATTANOOGA
TENNESSEE**

**72
YEARS OF SERVICE**

TO THE
BUILDERS OF THE
SOUTH
AND SOUTHWEST
FOR

GLASS & GLAZING

**BINSWANGER
& COMPANY**

Memphis, Tenn. - Shreveport, La.

Richmond, Va. - Greensboro, N. C.

Columbia, S. C. - Houston, Tex.

Austin, Tex. - Dallas, Tex.

Fort Worth, Tex.



FOR EXCELLENCE OF PRODUCTION
IN OPTICS DIVISION

Oil-Bearing Formations Summarized in Government Text

Publication of a new summary of available information on the age and correlation of the oil-producing Lower Cretaceous formations of the Coastal Plain in Texas, Louisiana, and Arkansas was announced recently by the office of W. E. Wrather, director of the Geological Survey, of the Department of the Interior. The nature and correlation of the known Lower Cretaceous formations in this important oil-producing area are shown by several maps and tables and two series of columnar sections, all printed on one sheet. In a descriptive text also printed on the same sheet the paleontologic and stratigraphic relations of the formations are briefly reviewed, and comparison is made of the nomenclature of the formations in the outcrop areas and in the subsurface. The sheet, entitled "Correlation of Lower Cretaceous formations of the Coastal Plain of Texas, Louisiana, and Arkansas," has been issued as Preliminary Chart 3 of the Oil and Gas Investigations series. Copies may be purchased from the Director of the Geological Survey, Washington 25, D. C., at 50 cents each.

Labor Shortage Severely Hampers Cotton Textiles

Cotton textile production is lagging. The industry has been faced since May 1 with a need for hiring nearly a quarter of a million workers up to November in order to expand its output to meet fully the estimated demands for cotton products, says War Manpower Commiss-

sion.

The inquiry required an increase of 28,500 in its total work force by November 1, as compared with May 1, and about 210,000 replacements over the same period, on the basis of the 7.7 per cent separation rate for April. Thus a total employment of 238,500 additional workers was the goal for the industry for the six-month period.

Total employment in the industry in May, 1944, was reported by the Bureau of Labor Statistics of the Department of Labor as 437,900, a decline of 14 per cent from the peak of 510,300 in December, 1942. Primarily as a result of the decline in employment, cotton textile production has been decreasing steadily since 1942, according to WMC.

Southern Textile Men to Advise O.P.A.

Frank Hill, head cost accountant, Consolidated Textile Corporation, Lynchburg, Va., and Horace Robertson, head cost accountant, Cannon Mills, Kannapolis, N. C., have joined the Office of Price Administration on a consulting basis and will serve in the Accounting Department to help in connection with the textile industry cost work. Three other cost accountants who recently joined OPA as consultants to help the agency with cost work pertaining to the textile field are Richard Carr, Gaffney, S. C., and Alexander N. Gee, both of the Spartan Mills, Spartanburg, S. C., and William J. Reddick, Jr., Victoria Cotton Mills, Rock Hill S. C.

W. E. Boone, Marshall Field & Com-

pany's manufacturing division, Draper, N. C., and William Bogart, Proximity Manufacturing Company, Greensboro, N. C., have been added to OPA's Cotton Section of the Primary Products Branch. OPA also announced the appointment of Robert H. Walker, vice president and former vice president and sales manager, Pickett Mills, Highpoint, N. C., to work in the Cotton Section.

A Soldier's Cotton Needs

Army Quartermaster authorities recently completed a tabulation which shows that it requires 136.06 yards of cotton material to equip initially and maintain a soldier in the U. S. for one year. In addition to materials which can be measured in yards, the Quartermaster Corps also supplies to each man approximately 42 pounds of cotton in the form of mattress filling, knitted garments and other items of clothing and equipment. Besides clothing, cotton items include such personal equipment as barrack bags, canteen covers, blankets, towels, sheets, pillowcases, mattress covers and cotton comforters. Cotton, next to steel, is the most important material of modern war.

Roberts Becomes Engineer of Norfolk Industrial Commission

Chilton Roberts, for a number of years associated with the Seaboard Airline Railway, has been appointed Industrial Engineer of the Norfolk Industrial Commission. A graduate of Princeton University, Mr. Roberts has engaged in a wide variety of engineering work.



MOCCASIN BUSHING CO.

MANUFACTURERS

**MOCCASIN OIL DISTRIBUTING BUSHINGS
PLAIN BRONZE BUSHINGS
BRASS AND BRONZE CASTINGS**

CHATTANOOGA — TENNESSEE

Draper,
proximity
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Cotton
Branch
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work in

STANDARD-COOZA-THATCHER CO.

SPINNERS and MERCERIZERS

of

Cotton yarns and threads

PLANTS

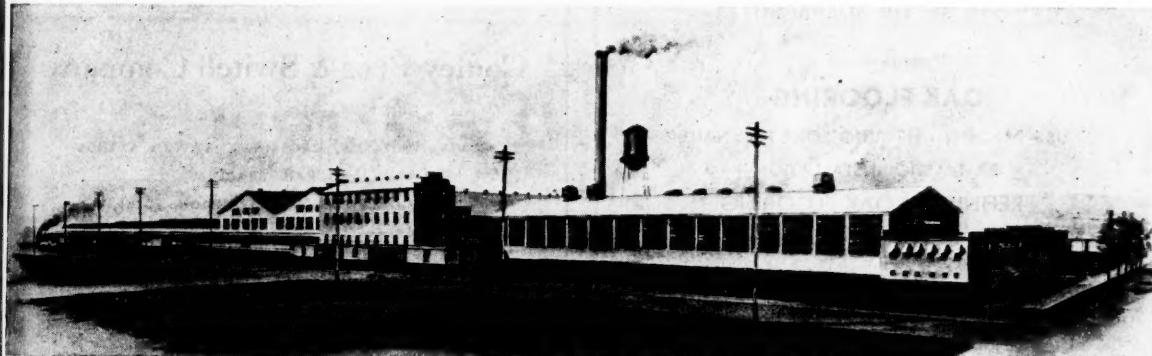
CHATTANOOGA, TENNESSEE

PIEDMONT, ALABAMA — GADSDEN, ALABAMA — ROSSVILLE, GEORGIA

General Sales Offices: 804 Lafayette Building, Philadelphia

BRANCH OFFICES:

New York 16, N. Y.—185 Madison Ave. · Greensboro, N. C.—Guilford Building
Chicago 54, Ill.—940 Merchandise Mart · Reading, Pa. · Reading 6262



TENNESSEE PAPER MILLS

— INCORPORATED —

Manufacturers of

ALL GRADES PAPER BOX BOARDS

CHATTANOOGA,

— - - - - TENNESSEE

Texas Minerals Above Billion

Texas led all states in mineral production in 1943 and was the only state producing minerals valued in excess of one billion dollars—\$1,116,056,000—for that year, according to the U. S. Bureau of Mines. The Lone Star State retained, for the ninth consecutive year, its rank of first in the United States in the value of minerals output. The Texas total represents 16.97 per cent of the national mineral production value.

Fuels were first with a value of \$993,242,000; non-metallics totaled \$93,181,000, and metallics came to \$29,633,000. Crude petroleum was the principal fuel and magnesium the leading metal. Non-metal-

lives, in order of importance, were sulfur, cement, magnesium compounds, sand and gravel, bromine, salt, clay, stone and lime.

West Virginia Keeps Lead in Bituminous Production

West Virginia produced a record of \$560,330,000 in minerals in 1943 and maintained its national rank of fourth in total value and first in bituminous coal production, with the solid fuel valued at \$450,128,000, according to the U. S. Bureau of Mines and the West Virginia Geological Survey.

Natural gas production totaled \$80,930,000; crude petroleum \$8,700,000, and

liquefied petroleum gases \$1,987,000. The remaining \$18,597,000 came from sand and gravel, lime, stone, clay products and raw clay, salt, grindstones and pulpstones, bromine and calcium chloride.

Next to 1943's record output, the most outstanding year was 1920, when a total of \$547,873,000 was reached. For the period 1911 to 1943, inclusive, the value of minerals produced in the Mountain State was \$9,728,600,000.

American Car and Foundry Co., at the fall meeting of the Board of Directors, declared a dividend of 1 1/4% upon the outstanding preferred stock payable December 21, 1944, to stockholders of record November 30, 1944.

T. M. CATHEY, President C. C. CATHEY, Vice Pres.
R. F. SHARP, Secretary-Treasurer

MEMPHIS HARDWOOD FLOORING CO.

Southern Hardwoods

AIR OR KILN DRIED
ROUGH OR SURFACED

Manufacturers of

OAK FLOORING

STRIP - PARQUET - HERRING BONE FOR NAILED
OR MASTIC INSTALLATION
PREFINISHED OAK FLOORING

OAK

MOULDING — DIMENSION — CEDAR CLOSET LINING
MEMPHIS 10, TENNESSEE

FISCHER SERVES THE MID-SOUTH

Building Materials, Reinforcing and Structural Steel,
Sash, Doors, Plywood, Ready Mixed Concrete,
Concrete Blocks and Bricks

FISCHER LIME & CEMENT COMPANY MEMPHIS, TENNESSEE

Conley Frog & Switch Company

Manufacturers of
FROGS, SWITCHES, CROSSINGS, SWITCH STANDS
AND RAIL BRACES
THE CONLEY BRIDGE EXPANSION JOINT

The Conley Patent Frog
SPECIAL TRACK WORK FOR STEAM, ELECTRIC AND
INDUSTRIAL RAILROADS, COMMERCIAL FORGINGS

MEMPHIS, TENNESSEE

INTERSTATE LIFE AND

ACCIDENT COMPANY

CHATTANOOGA, TENNESSEE

JOSEPH W. JOHNSON, M.D., President

*A policy to suit your needs with premium payments to
suit your convenience.*

MOUNTAIN CITY MILL COMPANY, INC.

Highest Grade Flour
ITS WHITENESS DENOTES ITS PURITY
MEAL GRITS and FEED

Chattanooga, Tennessee

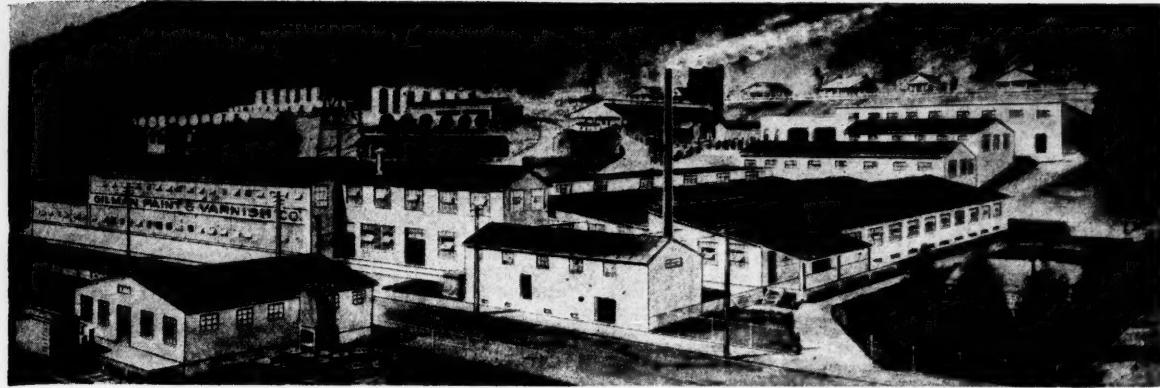
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GILMAN PAINT & VARNISH COMPANY

GOOD PAINT AND VARNISH MAKERS FOR OVER A THIRD CENTURY

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HOUSE PAINT

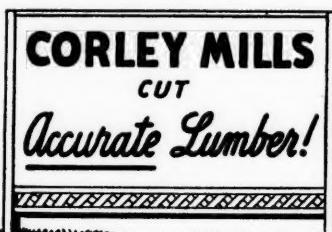
INDUSTRIAL FINISHES

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CHATTANOOGA

TENNESSEE



CORLEY circular sawmills produce ACCURATE lumber. That is why good sawmill operators prefer them and why concentration yard men prefer Corley-cut lumber.

OUR WARTIME POLICY has helped lumbermen with their big War job. Since historical December 7, 1941, Corley has filled over 40,000 orders . . . in ways to keep the most lumber rolling.

Few mills have been shipped to new operators. Instead, experienced and established lumbermen, capable of the greatest immediate production, have been supplied with Corley products.

Except for certain shipments to the Armed Forces, most of the orders have represented replacements, repairs and supplies.

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CORLEY MANUFACTURING COMPANY

ESTABLISHED 1905

CHATTANOOGA 1, TENNESSEE

Manufacturers of

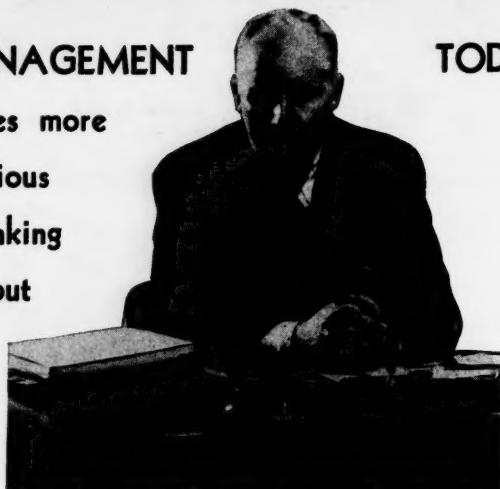
CIRCULAR SAWMILLS, EDGERS, TRIMMERS AND ACCESSORY EQUIPMENT

Branches: Little Rock, Ark. — Natchez, Miss. — Portland, Ore. — Seattle, Wash.

MANAGEMENT

TODAY

does more
serious
thinking
about



their Employees' FINANCIAL PROBLEMS

Accidents, sickness, trips to the hospital—perhaps an expensive operation—death of the Employee or in the family, maybe a new arrival . . . these are among sure-to-happen emergencies your Employees face constantly.

What's the answer?

Must they merely go it on their own?

More and more business and industrial firms—many of them among the nation's leaders—have found a scientific, satisfactory answer to such income-robbing emergencies through

Provident HUMAN SECURITY Plans
now operating from coast to coast.

These wholesale rate group plans offer three payment methods:

1. **Employers meet the entire cost**
(Such employer contributions up to 5% of current wages are considered deductible from taxes and not interpreted as a wage increase.)*
2. **Employers help Employees with part of the cost**
(*Similar application to part contributed by Employer.)
3. **Employees meet the low premiums by convenient payroll deductions.**

Let us without obligation outline a plan of Employee protection, based on our 57 years of "Know How," tailor-made to meet the particular needs of your plant.

PROVIDENT
LIFE AND ACCIDENT
INSURANCE Since 1867 COMPANY
Chattanooga, Tennessee

- One of America's "Top Ten" in the writing of Sickness, Accident and Hospital Insurance.
- Now bringing protection to more than ONE MILLION workers and their dependents.
- Operating Protection Plans for Employees upon a majority of the nation's chief railroads.

Life : Accident : Sickness : Group : Hospital

Aluminum Ingot Statistics

Statistics covering aluminum ingot produced by secondary smelters henceforth will be released monthly by the U. S. Bureau of Mines. The first report, covering January through August, 1944, is now published and will be followed each month by comparable statements to be derived from a survey at present conducted by the War Production Board.

Synthetic Resin Aids Plastics

Monsanto Chemical Co., St. Louis, Mo., has announced its technicians have perfected a new synthetic resin, which, when properly used in a low-pressure lamination process, will all but eliminate size as a restrictive factor in postwar plastics. In effect, the company said, this means an entirely new field has been opened to the plastics fabricator, whose mass production output is now very largely limited to small items such as table radio cabinets, telephone cases, instrument housings, tableware, compacts and kindred small items.

To produce even these through existing compression or injection molding methods, fabricators must employ large and costly machines whose size and weight progress in geometric ratio to the size of the plastic object being manufactured. Molded items larger than 36 inches across, other than flat sheets or panels are today virtually unknown. In low-pressure lamination, heavy machines are not needed. Moreover, manufacture is simplified by the fact existing three-dimensional items may be used as forms or molds, and thus duplicated in plastic.

Pittsburgh Corning Officials

H. B. Higgins, president of the Pittsburgh Plate Glass Co., has been elected president also of the Pittsburgh Corning Corp., replacing the late H. S. Wherrett. It was recently announced. R. L. Clause, vice chairman of Pittsburgh Plate, was named vice president of Pittsburgh Corning, which is owned equally by the Corning Glass Co. and Pittsburgh Plate. R. B. Tucker, vice president of Pittsburgh Plate, was elected to the subsidiary's board.

New Type Plate Bending Roll

Webb Corporation, Webb City, Mo., has recently marketed a new model initial type plate bending roll known as the Model R-3-L. This model roll can be made in 12 different capacities ranging from 8 feet of 5/16 in. to 4 feet of 5/16 inch. This new roll features the Webb totally enclosed speed reducer and the automatic balance bar. The same as previous Webb plate bending rolls, it is designed so that it is one of the most compact, efficient machines on the market today, say the makers. It is pictured equipped with manually operated raising of the rear roll. Power operated raise can be furnished when desired.

Railroad Man Appointed By Caterpillar Tractor

F. E. Schaumburg, since 1932 Chicago and Northwestern's Roadmaster, has resigned that position to join Caterpillar Tractor Co., Peoria, Illinois, as Railroad Representative, Sales Development Division. Mr. Schaumburg's new assignment will include the analysis and promotion of the use and application of "Caterpillar" Equipment for general off-track railroad construction and maintenance.

A native of North Dakota, Mr. Schaumburg began his railroading career as a chainman with the Northern Pacific Engineers in 1917. In 1924, he joined Chicago Great Western as assistant engineer of maintenance of way. There he remained till 1929, when he became associated with Chicago and Northwestern, where he rose to the position of Roadmaster in 1932. Appointment by Caterpillar Tractor Co. of a practical railroad man of Mr. Schaumburg's experience and acquaintance is a reflection of the emphasis which that company places on the future of its line of Diesel tractors, engines, motor graders, and earthmoving machines with the railroad companies of the United States and Canada.

Dolfinite Catalog Issued

A new catalog of Dolfinite products for the building industry has been published by Dolphin Paint & Varnish Co., Toledo, Ohio. It features their complete line of acoustic cement, aluminum paints, aluminum waterproofing, anti-rust coatings, barn paints, caulking compounds, cement floor paints, cork cement, dryers, enamels, enamel under-coats, glazing putties, heat-proof aluminum, ready mixed house paints, varnishes, wall size, washable flatwall paints, and wood floor paint.

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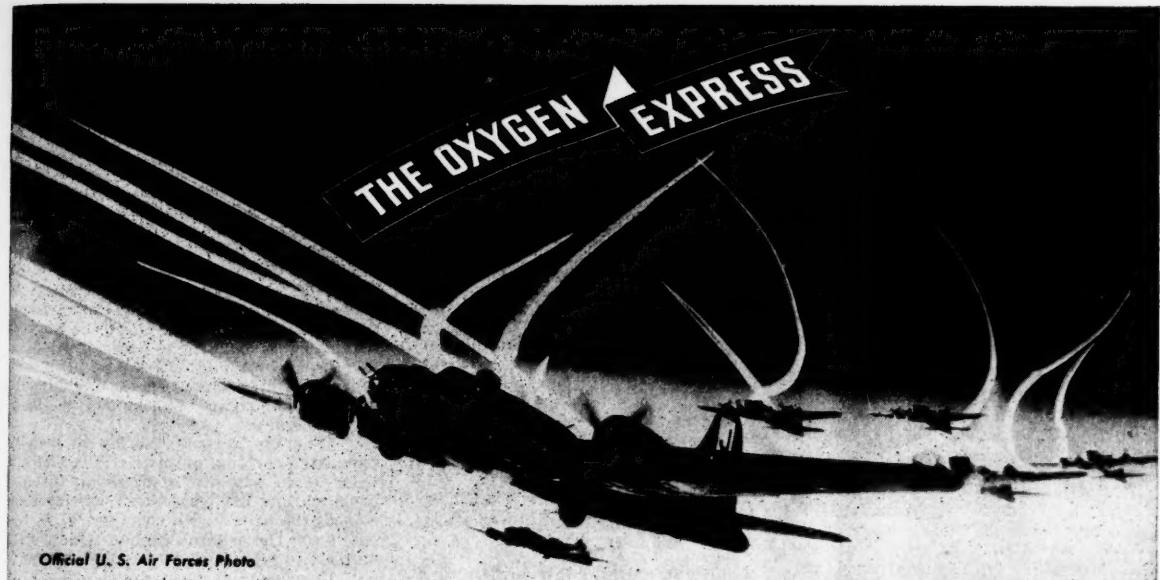
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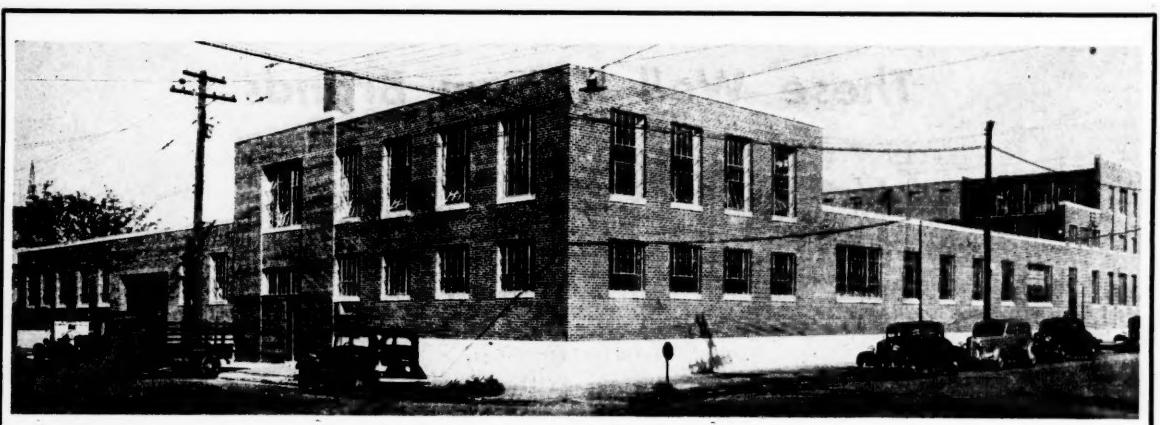
Official U. S. Air Forces Photo

Thundering through the sub-stratosphere with trails of vapor marking their course, American bombers and swift fighters deliver smashing blows at the enemy. These high-altitude sweeps could not be made without oxygen, which means life itself at more than 10,000 feet. **Air Products** mobile and stationary generators supply oxygen

on many battlefronts. **Air Products** is concentrating today on oxygen generators for military use, and will continue to do so until every victory is won. After the war the company will resume construction for industry of modern, efficient plants using the air liquefaction process for the production of oxygen, nitrogen and other gases.



Manufacturers Road, Chattanooga 5, Tenn.



BURK-SCHIER

BURK-SCHIER

Manufacturing Chemists for the Textile Industry
Distributors of Industrial Chemicals, Laundry
and Dry Cleaners Supplies.

BURKART-SCHIER CHEMICAL CO.

Nashville

CHATTANOOGA

Knoxville

Rand-McNally Bankers' Directory

The final 1944 Edition of the Rand-McNally Bankers' Directory, just issued, indicates a healthy condition as far as bank earnings are concerned. In the last six months, bank loans went up \$1,905,154,000. During the same period, deposits increased \$11,115,663,000 and the holdings of Government securities \$10,188,198,000, to an all-time high of \$76,122,535,000. Small declines were registered in other securities and in cash and exchange due from other banks. Although capital remains substantially the same during the six month period, undivided profits and reserves show an increase of \$217,303,000.

Other pertinent banking statistics shown in the Blue Book indicate the unprecedented quota of bank assets and stability of the whole banking structure. Slight decreases have been registered in a number of banks in all categories in the past half year. The total of national banks decreased from 5,044 to 5,039 State banks and trust companies decreased from 9,507 to 9,496 and private banks from 148 to 145, leaving 14,791 head office banks, a decrease of 21 in the past six months.

Mica in Alabama

The Geological Survey of the U. S. Department of the Interior is engaged in an extensive study of mica deposits in Alabama. A number of mines in Clay, Randolph, and Tallapoosa counties have been mapped recently by the Survey. Copies have been placed in open file and may be consulted in the Office of the

State Geologist, University of Alabama, Tuscaloosa.

Virginia Mica Deposits

The Geological Survey has been making studies of a number of mica deposits in certain counties in southwestern Virginia. Detailed results of the investigations are not immediately available, but those interested may study maps of the area in the Office of the State Geologist, University of Virginia, Charlottesville.

Gardner Expands Nashville Operations

D. W. Gardner, engaged in the construction business throughout the South for many years, has made extensive additions to his plant in Nashville, and has installed a complete wood-working plant. In addition to making beverage cases and toys, the plant will have a large section specializing in authentic handmade reproductions of period furniture.

Louisiana Minerals Set New Record

Louisiana advanced from 7th to 6th place in the nation in the dollar value of minerals produced, establishing an all-time state record of \$267,617,000 in 1943, according to reports of the Bureau of Mines, United States Department of the Interior. Crude petroleum of the Pelican State was valued at \$149,500,000; natural gas, \$87,220,000, natural gasoline, \$9,486,000; sulfur, \$9,087,000; salt, \$3,678,000, and liquefied petroleum gases, \$2,112,000. Other important minerals produced were sand and gravel, \$3,046,000; clay products, \$700,000, with cement, magnesium,

lime and stone contributing \$2,788,000 to the grand total.

Louisiana's yearly mineral production passed the \$100,000,000 mark in 1920, and in 1941 it passed the \$200,000,000 mark when output was valued at \$228,440,000. Since 1910 minerals from Louisiana have totaled nearly \$3,000,000,000.

Surplus War Property Purchases

A national selling program of interest to all purchasers of surplus property has been announced by Russell C. Duncan, Deputy in charge of Sales and Merchandising of Treasury's Office of Surplus Property. No longer will it be necessary for persons to contact each of the eleven regions of the country to determine what surpluses are available because information on all large quantities of goods will be available right "next door" to each regional office.

A "Surplus Reporter" is to be issued from each regional office at regular intervals. This will advise firms on Treasury's mailing list what the Treasury has to sell, the area in which material is located and the general method which will be used to sell it. Interested purchasers will then contact the regional office and indicate their interest. If disposition is to be made by invitation to bid, forms will be sent. If sale will be made by fixed price, negotiation or otherwise the prospective purchaser will be so advised.

BOILER FEEDWATER TREATMENT

National Aluminate Corp., 6216 W. 66th Pl., Chicago 38, Ill., has issued a special bulletin No. 30, titled "Questions and Answers on Boiler Feedwater Treatment" that will be of interest and service to those confronted with problems of boiler scale and other water impurities damaging to equipment.

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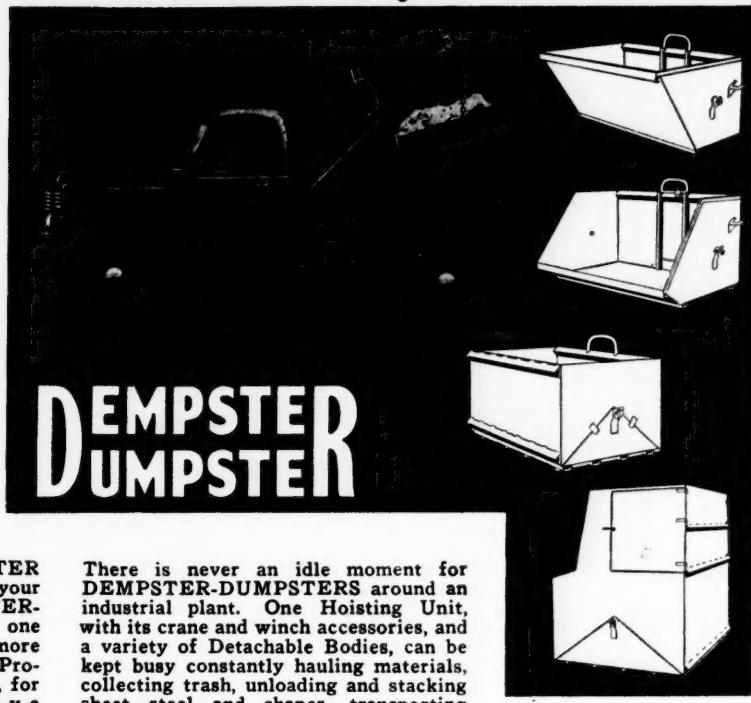
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INDUSTRIAL TRUCK SAFETY

High interest in accident prevention measures was indicated in the responses received by Elwell-Parker Electric Co. following publication earlier this year of a set of safety rules for the operation of power industrial trucks. The company has had the rules printed on a pocket-size cardboard folder, with corners rounded and the surfaces varnished for greater durability. Each of the 34 safety ideas is presented as a brief suggestion applicable to the operation of all makes and types of power trucks. Copies may be obtained on request from the Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 14, Ohio.

METALS AND ALLOYS DICTIONARY

Containing over 10,000 useful metallurgical terms, this up-to-date reference work has definitions of metallurgical terms, compositions, properties and uses of the important commercial alloys. It gives the physical constants and properties of chemical elements, description of machinery and processes used in modern metallurgy, and other pertinent in-

formation. Especially designed for the use of all those who want to know about the applications and peculiarities of metals, alloys and raw materials, this book is a "must" for the libraries of those working in metallurgy. Chemical Publishing Co., Inc., Brooklyn, N. Y.—\$4.50 net.

V-BELT HANDBOOK

Said to contain the greatest amount of data ever assembled in a similar volume, The B. F. Goodrich Co., Akron, Ohio, has published a 74-page V-Belt Handbook for Industrial Applications. It discusses the operating advantages of V-belts, qualities to seek in the product, installation and care, sheaves, selection of the V-drive, and general information covering the whole field. Address Goodrich, direct, for copy.

ETHYL CELLULOSE BOOKLETS

Two technical booklets on ethyl cellulose, base of many plastics, flexible lacquers, quick-drying varnishes, inks, adhesives, fabric coatings and electrical insulation, have been published by Hercules Powder Company's Cellu-

lose Products Department. The 48-page booklet on "The Properties and Uses of Ethyl Cellulose" lists and describes the characteristics which have resulted in ethyl cellulose being accepted for so many industrial uses. Twenty-two tables and eleven graphs illustrate and explain the effect of ethyl cellulose in various formulations.

The second booklet, entitled "Ethyl Cellulose Formulations with Resins and Plasticizers," was prepared for those interested in making practical use of ethyl cellulose.

Seven tables, showing the test results obtained on ethyl cellulose lacquers and nitrocellulose comparison formulas, are included in the section on application of data.

FILES AND RASPS

Printed copies of Simplified Practice Recommendation R6-44, files and rasps (American pattern, and straight- and curved-tooth milled files), are now available, according to an announcement of the division of simplified practice, National Bureau of Standards. Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, 25, D. C., for 10 cents each.



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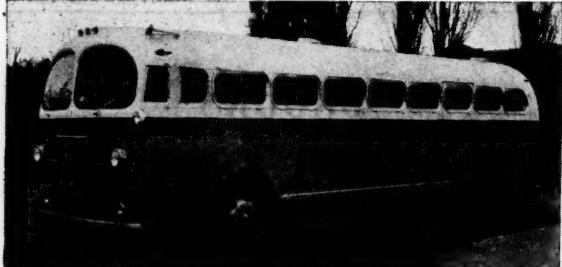
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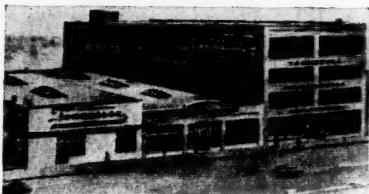
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Rayon Industry Outlook

(Continued from page 172)

in the past."

Present projected capacity of the rayon industry is approximately 810,000,000 pounds yearly, of which 240,000,000 pounds represent tire yarn, a one-purpose fiber, and the rest—560,000,000 pounds—rayon for weaving and knitting, according to the survey. Post-war expansion in rayon capacity will depend, to some extent, on the success and permanency of rayon tire cord, it is stated.

"Neither executives in the rayon industry nor the tire industry have crystallized their views for public consumption on the tire yarn post-war outlook. Some feel that rayon tire yarn may only be economically produced in a one-purpose plant like that of Industrial Rayon Corp., which has an acknowledged cost advantage in using wood pulp and in its continuous process. Some believe that tire yarn conversions have been hastily arranged under the war emergency, are high cost, and cannot be considered permanent.

"One authoritative source estimates that 160,000,000 pounds out of the 240,000,000 pounds of tire yarn capacity will stay in operation; another estimates 200,000,000 pounds. Dealing with four or five large and price-conscious buyers—the rubber companies—some of which also own cotton tire cord plants of their own, rayon companies may experience subnormal profits in the tire yarn business. Rayon tire cord itself is almost obligatory in large many-ply bus and truck tires exposed to gruelling highway conditions.

"Other rayon uses should grow in the aggregate. Although rayon growth has already been sensational, rayon consumption is still a small part of total fiber usage—about 10 per cent. Since a majority of women's dresses are already made of rayon and the rest from wool, cotton, reworked silk, and other materials, this remaining market will be attacked not only by rayon but also by nylon and aralac.

"The wool going into men's and women's suitings normally amounts to about 300,000,000 pounds yearly. This will be a tempting market for rayon staple fiber but susceptible to slow invasion because wool thus far has proved the most durable for suitings. However, some progress will be made, certainly in the direction of light weight summer weaves for men and women's (less durable) suitings.

"Nylon staple fiber, when it is actively introduced, should be watched because it is expected that it can be made to simulate wool closely. A field which uses over 300,000,000 pounds of cotton annually—men's shirts and utility clothing—can only be won over on the basis of launderability. There are many smaller and less easily analyzed applications for textile fibers, in which rayon and the newer synthetic fibers will find a permanent place."

Chemistry and chemical engineering are largely responsible for the improvements made over a period of years, Mr. Laufer says. "Such changes have been

gradual and not sensational, but their cumulative effect has constituted a powerful underlying force," he adds.

"Improvements have taken the prosaic form of refinements—of better lubricants, of sizing materials, dyes, coatings, etc. Machinery has been speeded up, has been made more resistant to corrosion and given a longer life. Finer filaments were developed; spun-dyed yarns were created. Medium-tenacity and high-tenacity yarns, which have an improved wet strength, have been developed. Even the shortcomings of certain yarns were utilized—the characteristic of acetate to fuse or melt under heat and pressure was used to create finishes for style fabrics, to make fused collars.

"Chemical research will continue to be actively pursued. There is still a great incentive to improve processes, develop labor-saving machinery, and increase recoveries. Wage rates are definitely on the uptrend, and commodity prices are increasing. Many dye problems still exist. Possibly there is more to know of pigmented yarns. There are still a number of steps which are batch in nature and could be put on a continuous basis.

"Especially to be watched is the accent on special rayon fibers, such as high-strength yarn and special finishes. The production of these special fibers calls for special solutions, new chemical problems, and adjustments in mechanical production methods. It requires rayon producers to work more closely with their customers on technical and commercial matters.

"The textile industry, equipped before the war with a variety of crease-resistant, flame-resistant, mildewproof and other finishes for fibers, has been exposed to many new ones for fireproofing canvas, waterproofing clothing, and creating other desirable qualities in fibers not inherently possessing them. The rayon industry has much to do in this direction.

"Not only are some foreign producers now on a self-sufficient basis but they are able to export. This situation could, in time, be the cause of some unsettlement because the home industries in many countries are now fully matured and are no longer to be considered as infants.

"As a consequence, time may show that more tariff protection is needed abroad or some international trade agreements es-

(Continued on page 172)

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Veterans Apprentice Training

Apprentice-Training Service of the Bureau of Training, War Manpower Commission, Washington 25, D. C., has prepared a special pamphlet, "Apprentice Training for Veterans," which sets forth, briefly and clearly, an explanation of apprentice training as applied to returning veterans, what it leads to, and what enters into the various steps of this training as conducted by American industry. The pamphlet was prepared in answer to the many requests the Commission has received from organizations and firms which are helping veterans to find their places in civilian life. Veterans and others interested in the Apprentice-Training Program are invited to address inquiries to the Apprentice-Training Service, War Manpower Commission, Washington 25, D. C., or any of the 26 states in which apprentice-training programs have been established.

Goldsboro Plans for Postwar

A postwar program for the development of eastern North Carolina is outlined in a 44-page booklet issued recently by the *Goldsboro News-Argus*, afternoon daily of that city. The booklet is a reprint of articles by leaders in the fields of agriculture, transportation, forestry, industry, banking and related activities that will play major roles in the section's overall development when peace comes.

Edited by Henry Belk, acting editor and general manager of the *News-Argus*, copies of the booklet will be filed in college libraries, sent to local and state planning group members, and offered to civic organizations for program purposes.

Hanes Installs Snack Bar

An efficient system for delivering beverages and other light refreshments to about 2,000 employees during working hours is one of the practical features that have been developed by Hanes Hosiery Mills, Inc., Winston-Salem, North Carolina, in furthering their policy of maintaining a high level of working conditions. Officials of the company decided that a between meal pick-up in the nature of a soft drink, candy bar or sandwich would be beneficial to employees and help to eliminate fatigue. They decided upon the idea of mobile trucks which could be taken to each department to serve each group of operators in that department.

The plant layout comprises a system of long aisles, some departments being as remote as 1,400 feet from the commissary supply. For the most satisfactory results it was desirable that the refreshments must be accessible to the greatest number of individuals, to avoid undue absence from machines. It was also desirable to arrange this service at definite periods.

Hanes management met these conditions by providing double-deck buggies containing deep-icing receptacles for keeping beverages cold and trays for sandwiches and pastries. These buggies are stocked at the commissary, picked up by an Elwell-Parker power industrial truck and transported at high speed to designated positions throughout the large buildings. Deliveries of refreshments are made twice in the morning, three times through the afternoon and twice during the night. To reach all floors in the plant the truck travels on freight elevators.

Schedules are arranged so that employees in all departments can be served within approximately the same period and with a minimum of lost time from their posts. "The plan has worked well," states R. B. Crawford, Jr., vice president of the company, "and we believe that our commissary-on-wheels has added much to the health and well-being of our employees."

New Explosion Proof Motor

Century Electric Co., 1806 Pine Street, St. Louis 3, Mo., announces a new explosion proof motor for operation in ethyl ether vapors (Class I, Group C). The new motor is constructed to meet the specifications of Underwriters Laboratories.

Sodium Methylate Available

Sodium methylate, a versatile reagent for organic synthesis, is now commercially available as the result of a process developed by The Mathieson Alkali Works. It was announced recently by R. E. Gaze, director of research and development. Heretofore, users of this product have had to prepare it in solution as needed. The process developed for its manufacture utilizes sodium amalgam produced by the Castner electrolytic cell which Mathieson has used for many years to produce caustic soda and chlorine, according to Mr. Gaze.

The new product is a dry white powder containing "a minimum of 95 per cent of sodium methylate, not over 2 per cent of inorganic alkalies (sodium hydroxide and sodium carbonate) and not over 3 per cent of methanol." It is packaged in airtight containers and is said to be stable as long as it is not exposed to the air.

FEDERAL AGENCIES

The Citizens National Committee, Inc., 1400 L St., N. W., Washington, 5, D. C., has prepared, in booklet form, a descriptive tabulation of the 428 functional units of the Federal government. Available from the committee at 25 cents a copy, "Federal Agencies" can be of service to the business man as a guide book to the bureaucratic mazes of Washington.

NEW TAP HANDBOOK

Sossner Tap and Tool Corp., 161 Grand St., New York 13, N. Y., makers of dies, gages, taps and tools, have published a new handbook on ground thread taps that is available on letterhead request to the company. Substantially bound and unique in its design for ready reference, this book will be of real value to users of taps.

GRINDING AND FINISHING

Four helpful new booklets illustrating and describing the 3-M method of grinding and finishing, have been released and are available upon request from Minnesota Mining and Manufacturing Co., St. Paul, Minn. The booklets are profusely illustrated and give detailed descriptions of the 3-M methods.

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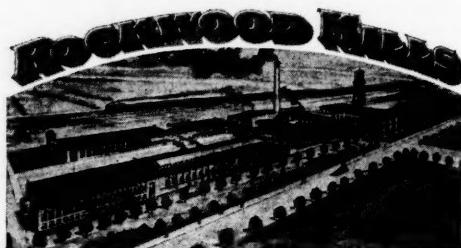
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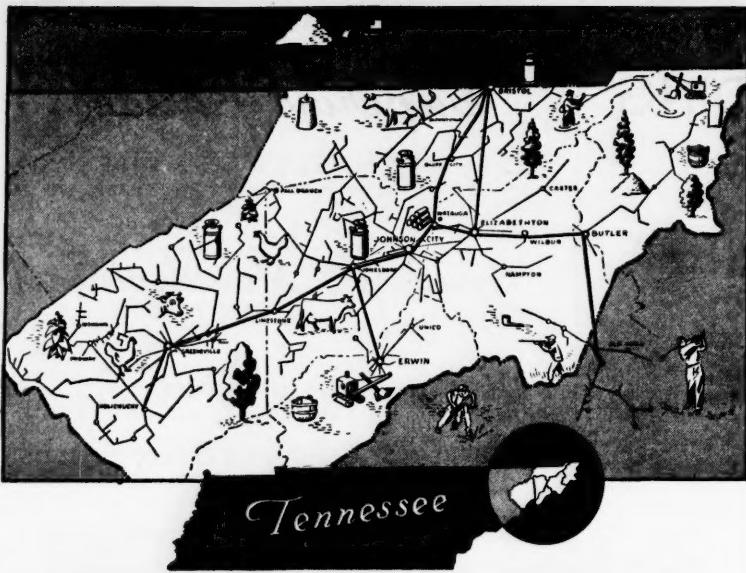
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The Industrial Development Department of East Tennessee Light and Power Company has compiled and collected facts which enable industrial prospects to appraise this area accurately in the light of specific needs.



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Many types of industries are now prospering in this area — others could locate here to their advantage.

Our Industrial Development Department is prepared to go into detail on facts and data which particularly apply to your business. Write the Industrial Development Department, East Tennessee Light and Power Company, Bristol, Tenn.-Va.

EAST TENNESSEE LIGHT & POWER COMPANY

Southern Expansions

(Continued from page 124)

natural gas pipe line from Hugoton gas fields in Kansas, Oklahoma and Texas to Detroit with branch extending into Wisconsin.

ARANSAS PASS — facilities — Defense Plant Corp., Washington, D. C., increased contract with United Carbon Co., Charleston, W. Va., to provide pipe line facilities at Aransas Pass to cost approximately \$220,000.

BRYAN — locker — Sam Murphy, has contract for constructing freeze locker and storage facilities; Brazos County Producers Cooperative Association, owners.

BURNET — frozen food locker and processing plant — H. M. Clements, Burnet, plans construction of frozen food locker and processing plant.

DALLAS — factory — Robert E. McKee, general contractor for construction of factory building, 426 Factory Street; cost, \$34,000.

DALLAS — plants — Merchants Cold Storage Co., erecting cold storage plants at cost of \$250,000.

DALLAS — franchise — Dallas County Commissioners Court, granted 50-year franchise to Texas Power and Light Co., to construct, maintain and operate poles and towers across public roads and highways for supporting its transmission and distribution lines.

DALLAS — plant addition — Borden Company, plans construction of addition to plant, to cost approximately \$25,000.

EDCOUCH — packing plant — Frank A. Smith, Mercedes, has plans in progress for packing plant.

EDINBURG — packing plant addition — Polis & Hagan, will construct addition to packing plant.

ELDORADO — rural lines — Southwest Texas Electric Cooperative, Inc., construct 220 miles of rural lines; \$150,000 REA funds available.

HILLSBORO — electric lines — Sierra Electric Cooperative, plans construction of 90 miles of electric lines in Sierra County; cost, \$100,000.

HOUSTON — addition — Leonard Construction Co., Chicago, Ill., has contract for construction of addition to chemical plant, Green's Bayou; Nytex Chemical Co., owners.

HOUSTON — facilities — City of Houston, voted \$5,000,000 bond issue to improve facilities of port of Houston.

KARNACK — addition — Esslinger-Misch Co., Marshall, has contract for addition to present ordnance plant, cost \$8,000,000, to be operated by Monsanto Chemical Co.

JOHNSON CITY — frozen food locker and processing plant — Dr. Ed Keley, sponsor, plans construction of frozen food locker and processing plant.

MCALLEN — packing plant addition — South Texas Produce Co., McAllen, will construct addition to plant, cost \$15,000.

MCALLEN — radio station — Valley Broadcasting Association, Inc., Lloyd M. Bentsen Development Co., Inc., Mission, has plans in progress for radio station.

MISSION — packing plant — M. Hutchinson, plans construction of packing plant near Mission.

PHARR — packing plant — Texas Products Company, will soon call for bids for construction of packing plant building, cost, \$150,000.

SAN ANTONIO — factory — Sanitary Mattress Factory, Paul Gentile, plans construction of mattress factory shop building.

SHERMAN — expansion — Mrs. Florence Massenburg, manager of Frozen Food locker, 222 West Lamar Street, purchased additional site for expansion.

STAMFORD — electric lines — Teague & Goodman, Sherman, has contract at \$34,060 for constructing 53 miles rural electric lines; Stamford Electric Co-operative, Stamford, owners.

VIRGINIA

FREDERICKSBURG — expansion — Sylvania Industrial Corporation, plans expansion program involving additional building, installation of more cellophane manufacturing units.

NORFOLK — radio station — Norfolk Broadcasting Corp. applied to Federal Com. (Continued on page 168)



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STEEL PLATE & MISCELLANEOUS IRON WORK
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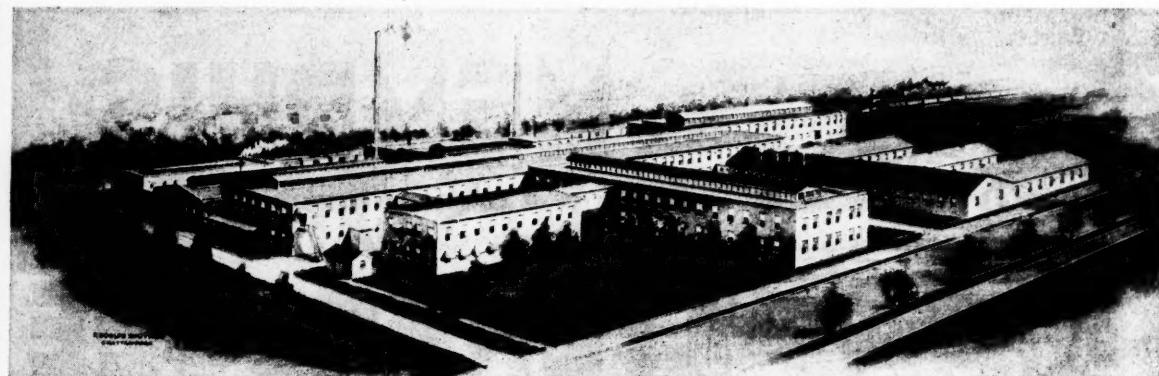
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Smoking Pipe Industry

(Continued from page 118)



ers have a word for a patch of the flowers — "rhododendron dell" — which is a vivid description of the impenetrable thickness of the growth. They are also called "slicks"—so closely packed that it seems possible one might walk across the top of them.

Brought to factories, the burls are axe-cleaned, sawed into slabs and then into blocks for the bowls. Machines bore the bowl and rough-shape the blocks. Sanding, staining,

polishing and stemming are other processes before final packaging for shipment. Some of the plants in the Appalachians ship the rough bowls to other factories for final finishing.

The current cigarette shortage has given tremendous impetus to the tobacco pipe industry. Largest customer of all is Uncle Sam, who is buying these mountain-made pipes in vast quantities for the Armed Forces.

At Sparta there is a factory, working almost 100 per cent on service orders, that is the mountain country's first and only pay roll industry. This plant makes pipes, complete, and does not ship any roughed out bowls to other manufacturers. A new venture, and doubtless the forerunner of many more like it, the Sparta operation is having difficulty in keeping abreast of demand.

Aluminum "Over Top"

(Continued from page 122)

metal containers including cans, tank bodies, motorcycles, electrical wiring devices, domestic mechanical refrigerators, domestic laundry equipment, automatic phonographs, caskets, burial vaults, fur-

niture and furniture parts, aluminum paint, light power-driven tools, cooking utensils, food processing machinery, engineering instruments and industrial type lighting equipment.

Although military demands for aluminum continue to create a manpower problem in many localities where fabricating plants are located, the facilities for producing the metal in all its forms in this country have stimulated a vast interest in the peacetime prospects for this light, versatile material. The lowered price of aluminum ingot, now 25 per cent below pre-war levels, and the fact that many thousands of additional workers are familiar with the characteristics and advantages of aluminum through its widespread use in the manufacture of war materials, give indication of a greatly enlarged civilian market after the war. Many new uses for aluminum, as well as the expansion of markets already established, are in the offing.

Southern Expansions

(Continued from page 166)

munications Commission for permission to establish a standard broadcasting station.

SHAWSVILLE—plant — National Gypsum Co., has acquired Kimballton Lime Co. of Shawsville.

WEST VIRGINIA

SISTERSVILLE—Federal Power Commission approved purchase by Monongahela West Penn Public Service Co., Fairmont, of all the electric facilities of West Virginia Light, Heat and Power Co.. Sistersville.



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Frisco is ready for postwar expansion in Memphis and the State of Tennessee where great opportunity awaits industry. Here will be found...low cost power...favorable climate...abundant supply of labor...many mineral resources...excellent transportation. The Great industrial City of Memphis is Frisco's gateway to these opportunities.

Inquiries regarding plant locations in Memphis are invited.

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STONE LUMBER COMPANY

Established 1894

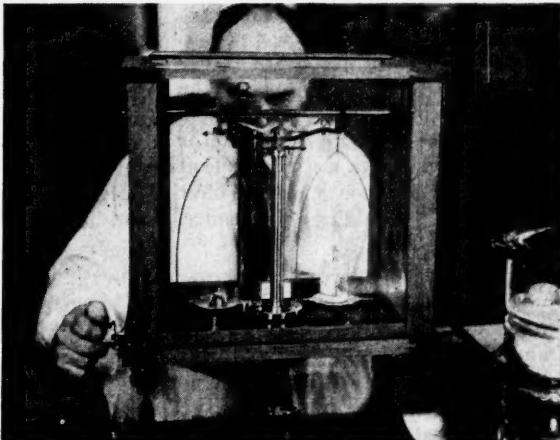
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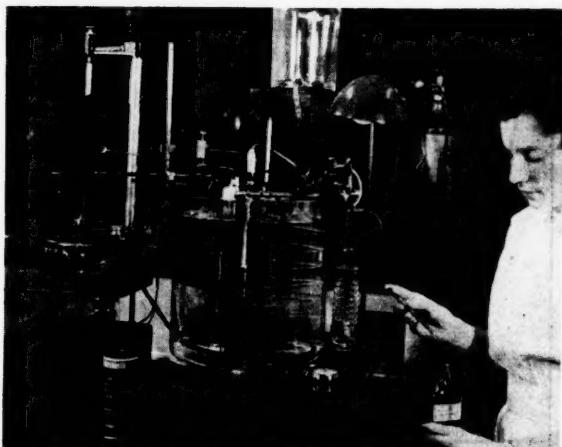
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Guardian of Today*

In the manufacture of medicinals, Research has a two-fold role: it opens the door to the yet undiscovered drugs of Tomorrow; it devises controls that safeguard the standards of Today. The research laboratories of The Chattanooga Medicine Company are the life-blood of its production. Here is maintained the quality of its present products—here will be born its achievements of the future.



"For high achievement in producing materials needed for war," the Army-Navy "E" was awarded to The Chattanooga Medicine Company and its Food Division, Patten Food Products. A Star for continued production excellence was later added.

The Chattanooga Medicine Company
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CHARLES H. BOUCHER, Manager

DE SOTO BEACH HOTEL—
Savannah Beach, Georgia
J. MARSHALL MORROW, Manager

Multiple Industrial Tenancy

(Continued from page 114)

community will provide for him the exact amount of space his independent business venture will need, or it will provide him a ready market for the services he may wish to offer—trucking, repairing, insurance, etc.

Aggressive and successfully growing industrial cities have always offered special inducements to new and diversified industries, and have gone so far as to furnish free land, special tax concessions, free utilities for a limited period of time, and in some cases, free buildings to industries that would move in. This has been a successful local policy when intelligently administered. The acquisition by a community, or by a business group within the community, of one of the larger war plants for multiple tenancy operation will put that community in an ideal position to offer economically many of the advantages that communities have in the past offered at great cost to themselves.

Industrialists, economists and others foresee an era of decentralization of industry in the years immediately following cessation of hostilities. Those communities which have an established MIT venture will be in strategic position to add more small industrial operations to their local economy with resultant benefits to all classes of trade and professional men.

Decentralization does not imply that great plants like those of Ford, General Motors and others of similar size will break up into small plants to be scattered over the country, but it is probable these will, as in times past, establish more and more assembly and warehousing units throughout the 48 states. However, there are many industries that will find decentralization an advantageous move, especially in the fields of food processing, manufacture of clothing, pharmaceuticals, paint, to mention but a few.

Another factor which will bring about decentralization is the congestion existing in urban areas, many of them literally top-heavy

with populations weary of living in expensive, cramped quarters ten to thirty or more stories above street levels. These victims of our overcrowded cities will seek out less congested localities where they can enjoy more freedom of movement and get closer to nature, opportunities offered by scores of smaller cities now having war production plants that can be fitted to the Multiple Industrial Tenancy plan.

Going back to the returning service man and his government-provided capital for establishment of his own small business, it is more than likely that the majority of these potential small manufacturers will prefer the smaller community to the crowded city.

The writer can say this from personal knowledge of what a battle-experienced veteran wants in the way of living conditions when it becomes time to beat the weapons of war into the tools of peace.

The Multiple Industrial Tenancy proposal is advanced as an economical means of putting into produc-

(Continued on page 172)

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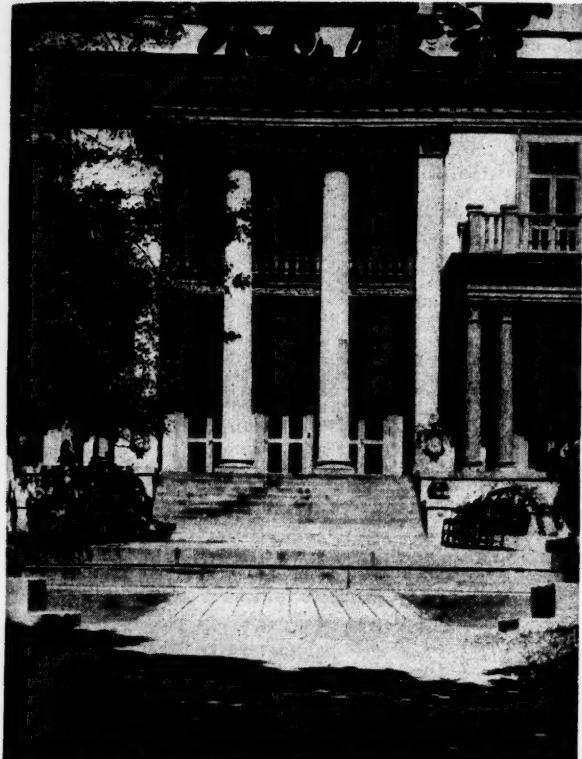
Hardwoods of excellent manufacture and good texture.

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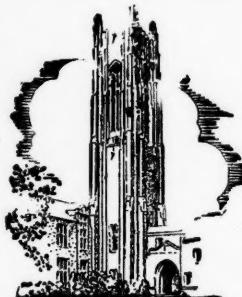
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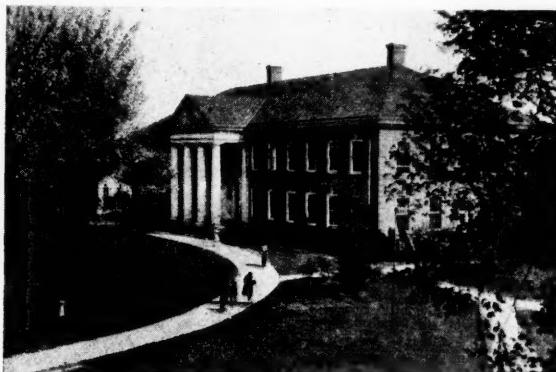


Who will prepare the individuals needed to undertake the critical tasks of social, educational, and spiritual rehabilitation for demobilized veterans and civilian workers in the United States, as well as among war sufferers abroad?

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Every dollar you give will mean two dollars for Christian education. Lipscomb can become a fully accredited four-year college when this goal of \$600,000 is reached. You have an opportunity to invest in the building of Christian character through each contribution to the Lipscomb Expansion Program.

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LIPSCOMB EXPANSION PROGRAM
DAVID LIPSCOMB COLLEGE
NASHVILLE 4, TENNESSEE

Wartime Steel Research

(Continued from page 116)

other metals to more severe temperature tests than ever before. Obviously, enlarged knowledge about the effects of temperatures will be helpful in peacetime. Three companies have initiated programs of research on the related subjects of alloys, suitable for applications where high temperatures are a factor, such as are encountered in airplane superchargers and gas turbines.

A study of the heat treatment and ballistic resistance of steels for lightweight armor plate might appear at first glance to be strictly a wartime project, yet the findings may be valuable in improving steel for coal chutes and other purposes. Seeking improved steels for guns, several laboratories are cooperating in the study of improved compositions and heat treatments. The results should be applicable to other types of severe service, in postwar automotive engines for example.

Another study that holds promise of peacetime benefits is devoted to the development of special stainless steel articles, such as springs, where an exceptionally high proportional limit and tensile strength are desired.

Several research projects are centered upon welding. Fundamental studies on the heat-treating characteristics and metallurgy of boron-treated steels are also being made. A recently developed black oxide coating for stainless steel, which has already been introduced to steel users, is being further pursued from the research standpoint.

Other projects include: Electropolishing processes for stainless steel; the commercial development of stainless steels possessing precipitation hardening properties; the mechanical properties and metallurgical characteristics of low alloy constructional steels; research on heat-treated stainless steel for aircraft struc-

tural members, research on alloy steel for certain highly stressed aircraft parts, and study of the effects upon steel of extreme cold, such as might be found at high altitudes or in the Arctic.

Rayon Industry Outlook

(Continued from page 162)

tablished. In pre-war years there was a substantial foreign trade in rayon among nations other than the United States. This country exports relatively little but did import large quantities of staple fiber, the need for which has now been met by our own facilities."

Multiple Industrial Tenancy

(Continued from page 170)

tive operation any war plant for which there will not be an available buyer who can make adequate use of the entire property. It will be a method of quickly putting war plants into peacetime production without the need for matching up individual factory space needs with individual plant areas. It will be a way to maintain high levels of employment, by materially shortening the time of readjustment from war production to manufacture for the pent-up needs for the wares of peace.

Bankers, Investors, Chambers of Commerce and others interested in securing a war plant for private tenancy are invited to communicate with

THE MANUFACTURERS RECORD

Moomaw Director of Rustless

Election of George D. Moomaw to the board of directors of Rustless Iron and Steel Corporation has been announced by Charles R. Hook, Sr., chairman of the board of the Baltimore concern. Mr. Moomaw is vice president in charge of operations, a post to which he was elected in January, 1942. He came to the company in June, 1939, as works manager.

Marine Engines Available

The U. S. Maritime Commission, Surplus Property Section, has 178 new marine engines—diesel and gasoline—for sale to manufacturers, distributors, dealers and other qualified users. All of the engines are available for prompt delivery to purchasers; many are crated for either export or domestic shipment. Inquiries should be addressed to the Surplus Property Div., U. S. Maritime Commission, Washington 25, D. C.

Westinghouse Honors Bauble

James A. Bauble, assistant manager of the Public Relations Department of the Westinghouse Electric and Manufacturing Company, has received the company's Order of Merit in recognition of "exceptional ability" in his field. The award, highest the company bestows upon its employees, was voted by the Westinghouse board of directors, and the presentation was made at a brief ceremony. The Order of Merit award carries with it a bronze plaque bearing a silver "W" and an engraved citation certificate.

Perspective Drawing Instruments

Charles W. Downs & Son Co., 2280 14th Street, Detroit, Mich., announce a line of recently developed perspective drawing instruments for use in both engineering and art fields. Known as the Truper series, the line includes a wide variety of perspective graphs which permit the artist to show his subject at any chosen angle. There is also a set of perspective circles for avoiding distortion, and perspective scales showing diminishing units of measurement as they recede toward the vanishing point.

Naphthenate Wood Preserver

Quigley Company, Inc., 527 Fifth Avenue, New York, is offering Triple-A copper naphthenate wood preserver for controlling dry rot, fungi and molds in wood. The preservative is applied by brush, spray or dipping and, according to the manufacturer, will deeply penetrate and impregnate the wood. One gallon will treat about 200 square feet of surface.

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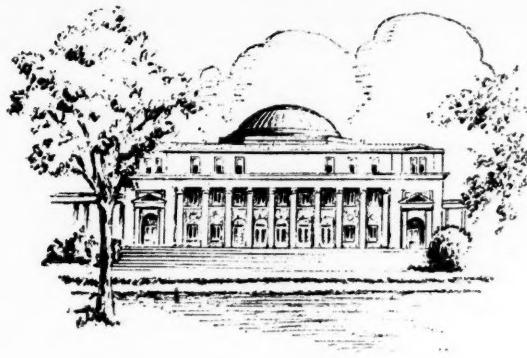
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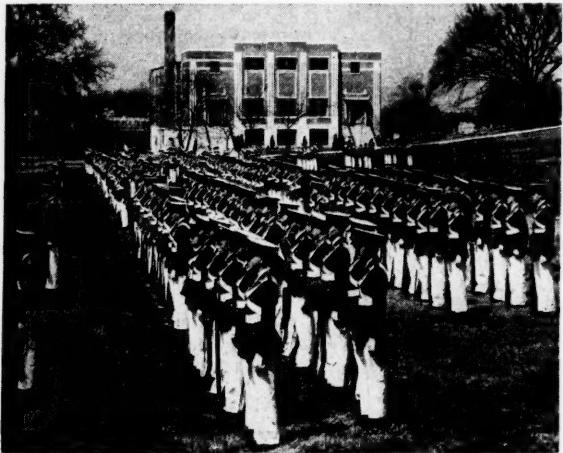
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Metlbond Adhesive

(Continued from page 128)

the surfaces to be bonded was necessary, such as sandblasting or treating with an emery wheel.

From this investigation it was decided that a satisfactory cement should have the following properties:

1. Low pressure during cure
2. Non-critical film thickness
3. Means of visual inspection of bond
4. Resistance to temperatures,

solvents, corrosion, and oxidation

5. Elasticity to withstand impact, peeling and vibration fatigue
6. Economy of application to compete with standard methods of attachment.

With these objectives as a goal, several types of Metlbond have been developed. At the present time, the following processes are available:

1. High pressure, high temperature, single phase, synthetic

rubber base cement, requiring 100 psi curing pressure at 330° F. for 20 minutes. The adhesive is sprayed on parts to be bonded.

2. Low pressure, high temperature, two phase Metlbond, requiring 15 psi curing pressure at 330° F. for 20 minutes. The synthetic rubber component is sprayed and a plastic component brushed on parts to be bonded.
3. Two types of tape, one requiring 250° F. curing temperature, and the other 330° F. curing temperature. Both types require a curing pressure of 100 psi. The high temperature type has the highest shear strength and the best heat resistance. The low temperature type can be used where the parts contain fiber inserts or other organics unstable at 330° F.
4. A very low pressure, high temperature Metlbond, requiring a curing pressure of 1 psi and a curing temperature of 330° F. The shear strength of this type is approximately two-thirds that of the first two.

A number of different types of materials were used in experimenting with metal to metal adhesives. Rubber hydrochloride gave shear strengths too low for structural purposes, particularly at -70° F., and also exhibited low resistance to aromatic solvents and salt water. Several plastics were considered. While some of these adhesives gave shear strengths as high as 6,000 psi compared to 1800 psi for the average riveted method, they were not suitable for construction of aircraft be-

(Continued on page 175)

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Metbond Adhesive

(Continued from page 174)

cause they were too brittle. Poor impact and peel resistance also resulted because of the brittleness, especially at low temperatures. The thermoplastic resin cements exhibit unsatisfactory characteristics due to softening.

However, when some of the thermosetting resins were combined with synthetic rubbers, adhesives were developed which exhibited none of the weaknesses of the simple plastics. They were found suitable for commercial use except that they required high curing pressures and rather expensive jigs.

Development of a synthetic rubber-plastic type cement resulted which does not have deficiencies of other cements; it has satisfactory

physical properties and sufficiently low curing pressures to obviate use of expensive jigs.

The rubber base gives adhesion to the metal and flexibility to the finished bond. The plastic base cement exhibits a viscosity during the cure sufficiently low to fill any inequalities in the surfaces of the materials being bonded.

Metbonds have been under development and testing for over a year. During this time, assemblies have been installed on several airplanes manufactured by Consolidated Vultee, including Liberator B-24 bombers, C-87 transports and Valiant BT-13 trainers. No indications of failure have appeared after several hundred operational hours.

Tests included immersion of specimens in ocean water. Subjected to exposure on an ocean beach

where they were immersed at high tide and exposed to the air at low tide, Metbond specimens lost only 5 to 10 percent of their strength over a period of 2 months. In aromatic fuel the cement continues to lose strength until the fuel penetrates the bond. At this point shear pulls from 35 to 40 percent below ultimate are recorded regardless of the time immersed. When completely dried out, the joint regains its full strength.

Fatigue life tests of Metbonded joints show that loads between 1000 and 1500 psi can be supported continuously for a year. Probably more important than the static fatigue characteristics are those of dynamic fatigue. Specimens were tested in special equipment which operated at a rate of 87 cycles per

(Continued on page 178)

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Southern Construction

(Continued from page 103)

struction, \$2,000,000,000. War Production Board estimates were \$2,090,000,000 and \$1,860,000,000, respectively. Indicated volume of non-farm residential building on that basis, according to the Producer Council, was \$1,300,000,000, including about \$50,000,000 for war housing. The expected number of new dwelling units was 300,000.

New farm construction was placed at \$275,000,000 during 1945; public utility construction at \$620,000,000, and highway construction at \$665,000,000. Private non-residential building was seen costing \$690,000,000, including \$460,000,000 for industrial construction. Military and naval construction was expected to drop to \$400,000,000 from the estimated \$825,000,000 for the country in 1944.

Further decreases in construction totals conceivably may be halted to a considerable degree by the ever-changing war picture. This may call for new types of building; for example, the new factories to be built at a cost of \$200,000,000 to make trench mortars, other ordnance and ammunition, a need that has arisen since the Nazi break-through in December.

Metbond Adhesive

(Continued from page 175)

minute. It was determined that the joints could withstand a load of ap-

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proximately 1000 psi for a period of a year.

While the Metbonds were developed primarily for aluminum-alloys, tests have shown that a wide variety of solids can be bonded successfully. These materials include pure aluminum, aluminum alloys, magnesium, steel, zinc, cadmium, fibrous glass, cotton, rayon, other celluloses, woods, natural and synthetic rubbers and several plastics.

The use of Metbonds has simplified the problem of corrosion which arises when two dissimilar metals are fastened by conventional methods. The presence of an electrolyte such as salt water with two different metals forms an electrochemical system which under certain conditions results in corrosion of one of the metals and a resulting failure of the assembly.

The Metbonds serve as electrical insulators between the pieces and prevent corrosion. This property is of particular importance in the assembly of airplanes constructed of both aluminum and magnesium parts which, when riveted, are extremely susceptible to corrosion. In addition to preventing corrosion in joints between dissimilar metals, the Metbonds are sufficiently flexible to allow for the variation in thermal expansion when two differ-

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PORTABLE DERRICK, self elevating, electrically controlled load limit. Boom rests on ground. Public utility company have 34 1/2 ton line trucks equipped with this device. 4 man crew handle 1 to 5 pole extensions. A money saver. Pat. No. 2258383, 2261993, 2266196.

TRAILER HITCH, semi-self locking. Post war design. Pat. No. 2356998.
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ent materials are joined.

Research work is continuing in the laboratories of Consolidated Vultee Aircraft Corporation to develop Metbonds which are even superior to those now being used. It is expected that these new adhesives will find wide application since they can be used to bond many types of materials in addition to aluminum-alloys for which they were primarily developed. In the automotive field, Metbonded assemblies can be made which will not be subject to corrosion such as welded or bolted joints, with elimination of noise in such places.

